AIR QUALITY TECHNICAL REPORT
for the
Otay Ranch Village Two SPA Plan Amendment Project
City of Chula Vista, California

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SUMMARY

The Otay Ranch Village Two SPA Plan Amendment Project (proposed project) is located within Otay Ranch in the City of Chula Vista, California. The site is located southwest of Otay Ranch High School, south of Olympic Parkway and west of La Media Road, in an area designated as Village Two in the Otay Ranch General Development Plan (GDP). The project site consists of the R-7A, R-9A, R-28, and R-29 neighborhoods within Village Two. The proposed project would add 197 residential units within Village Two.

The air quality impact analysis evaluates the potential for significant adverse impacts to the ambient air quality due to construction and operational emissions resulting from the proposed project. Construction of the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. The analysis concludes that the daily construction emissions would not exceed the City's significance thresholds for criteria pollutants. Air quality impacts resulting from construction would, therefore, be less than significant. The proposed project would not result in any significant long-term (operational) impacts to air quality, as new mobile and stationary sources associated with the proposed project would remain well below the significance thresholds following the completion of construction activities. Thus, the air quality impacts would be less than significant.

The project's potential effect on global climate change was evaluated, and emissions of greenhouse gases (GHGs) were estimated based on the use of construction equipment and vehicle trips associated with construction activities as well as operational emissions once construction phases are complete. With implementation of GHG reduction measures, the proposed project would reduce GHG emissions by 25%. The proposed project would therefore achieve the target of 20% below business as usual, which has been established for the purposes of assessing operational GHG emissions of projects in the City of Chula Vista, and this reduction would be consistent with the goals of AB 32. Furthermore, the proposed project would be consistent with Section 15.26.030 of the City's Municipal Code by employing energy efficiency measures beyond that required by the state Energy Code (Title 24), resulting in a 15% reduction in emissions generated by in-home energy use. Additionally, the proposed project would reduce the overall use of potable water by 20%, consistent with the City's Municipal Code. Lastly, it should be noted that the project is higher-density residential development, which ultimately helps in reducing vehicle miles traveled. The project would therefore have a less than significant impact on global climate change.

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this report is to estimate and evaluate the potential air quality impacts associated with implementation of the Otay Ranch Village Two SPA Plan Amendment Project (proposed project) relative to the City of Chula Vista thresholds of significance for air quality impacts. In addition, the report includes a quantitative analysis of project-related greenhouse gas emissions.

1.2 Project Location

The proposed project site is located within Otay Ranch in the City of Chula Vista, California (Figures 1 and 2). The site is located southwest of Otay Ranch High School, south of Olympic Parkway and west of La Media Road, in an area designated as Village Two in the Otay Ranch General Development Plan (GDP). The project site consists of the R-7A, R-9A, R-28, and R-29 neighborhoods within Village Two (Figure 3).

1.3 Project Description

The proposed project includes amendments to the Otay Ranch GDP and the Otay Ranch Village Two, Three and a portion of Four Sectional Planning Area Plan (Village Two SPA Plan). The proposed project also includes one tentative map.

The Village Two neighborhoods subject to this proposal were graded in 2006. However, due to the ongoing negative housing market conditions and homebuyer financing challenges, the product types anticipated in the original Village Two approvals are no longer economically feasible. To jump start development in Village Two, the project applicant is proposing smaller, detached homes on small lots within neighborhoods R-7A and R-9A. The proposal also includes increasing densities within two neighborhoods (R-28 and R-29) to construct higher density multi-family neighborhoods within the village core. In some instances, densities are restored to approximately the same density originally approved as part of the Village Two Tentative Map (TM) and subsequently reallocated within Village Two through Substantial Conformance approvals. In other neighborhoods, higher densities are proposed to meet current and anticipated future market demand. The project applicant continues to implement the original vision for Otay Ranch Village Two through consistency with the "Santa Barbara" architectural theme and landscape theme.

Otay Ranch Village Two is a transit-oriented village with higher densities planned within the linear village core located between La Media Road and Heritage Road. The applicant is

proposing density increases within or adjacent to the Village Two core area consistent with GDP policies.

This project includes the following components:

1. Amend the Otay Ranch GDP, the Village Two SPA Plan to authorize a total of 2,983 residential units (878 single-family and 2,105 multi-family units), resulting in a net increase of 197 residential units.

2. Amend the SPA Plan as follows:

    a. Increase the authorized units within R-7A from 44 to 82 single family units. Rezone the R-7A neighborhood from SF-3 to RM-1. This amendment results in a net increase of 38 units.

    b. Increase the authorized units within R-9A from 56 to 67 single family units. Rezone the R-9A neighborhood from SF-4 to RM-1. This amendment results in a net increase of 11 units.

    c. Increase the authorized units within neighborhood R-28 from 46 to 135 multi-family units, resulting in a net increase of 89 units.

    d. Increase the authorized units with neighborhood R-29 from 89 to 148 multi-family units, resulting in a net increase of 59 units.

3. Amend the Planned Community District Regulations as necessary to implement the multi-family detached product types within R-7A and R-9A.

4. One Tentative Map for neighborhoods R-7A and R-9A Tentative Map containing 83 residential lots (and an optional lotting scheme containing 85 lots) and associated infrastructure is also proposed.

Table 1 below includes a summary of the proposed land use changes from what is currently approved for the project site.

Table 1
Proposed Project Land Use Changes

Neighborhood	Existing Zoning	Existing Units	Proposed Zoning	Proposed Units	Change in Unit Count
R-7A	SF-3	44	RM-1	82	+38
R-9A	SF-4	56	RM-1	67	+11
R-28	RM-2	46	RM-2	135	+89
R-29	RM-1	89	RM-1	148	+59
TOTAL		235		432	+197

Construction is estimated to be completed in approximately 4.5 years.

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FIGURE 1

Regional Map

Air Quality Technical Report for the Otay Ranch Village Two SPA Plan Amendment

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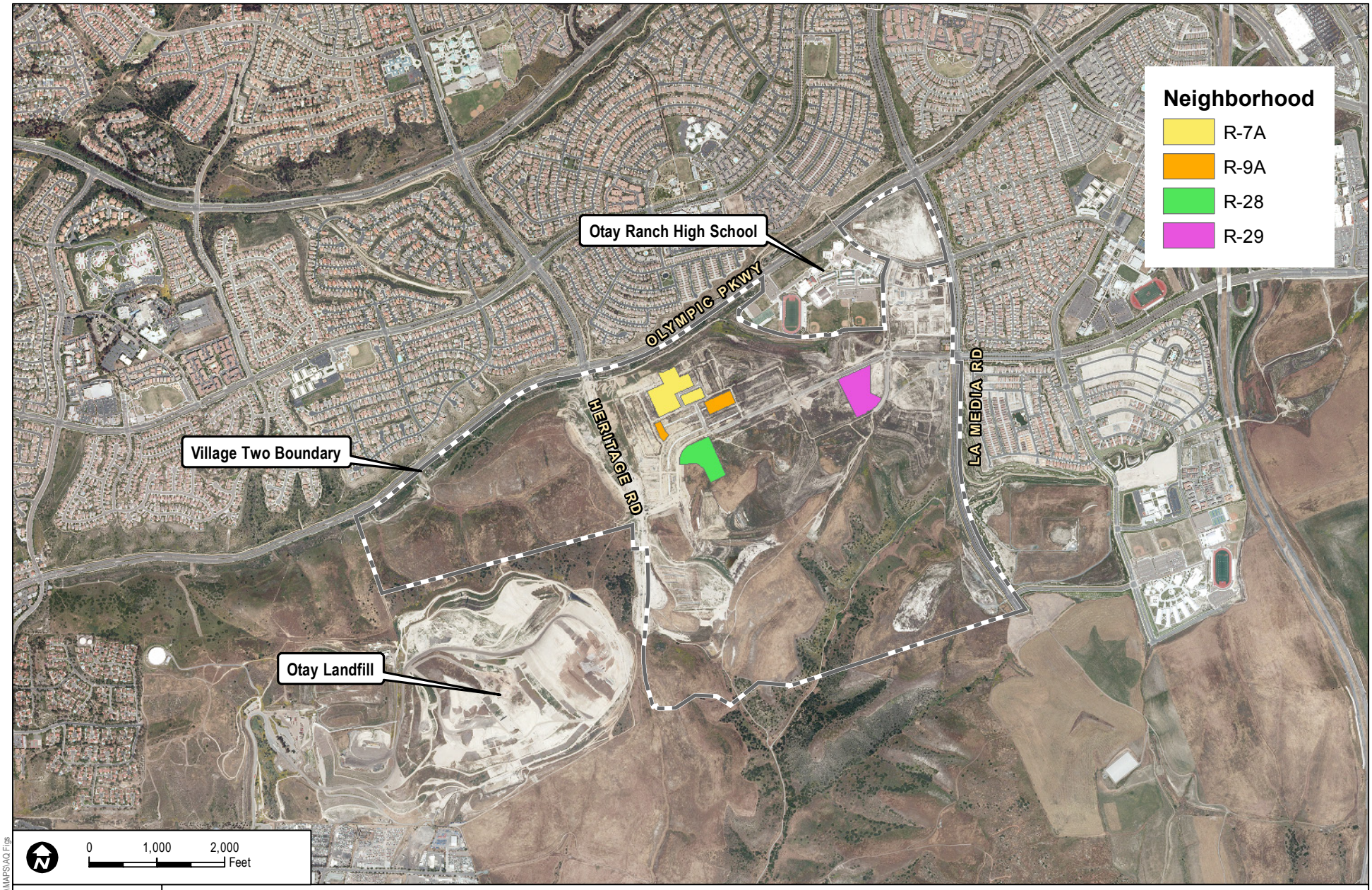

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AERIAL SOURCE: NAIP 2010

FIGURE 2

Vicinity Map

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Air Quality Technical Report for the Otay Ranch Village Two SPA Plan Amendment

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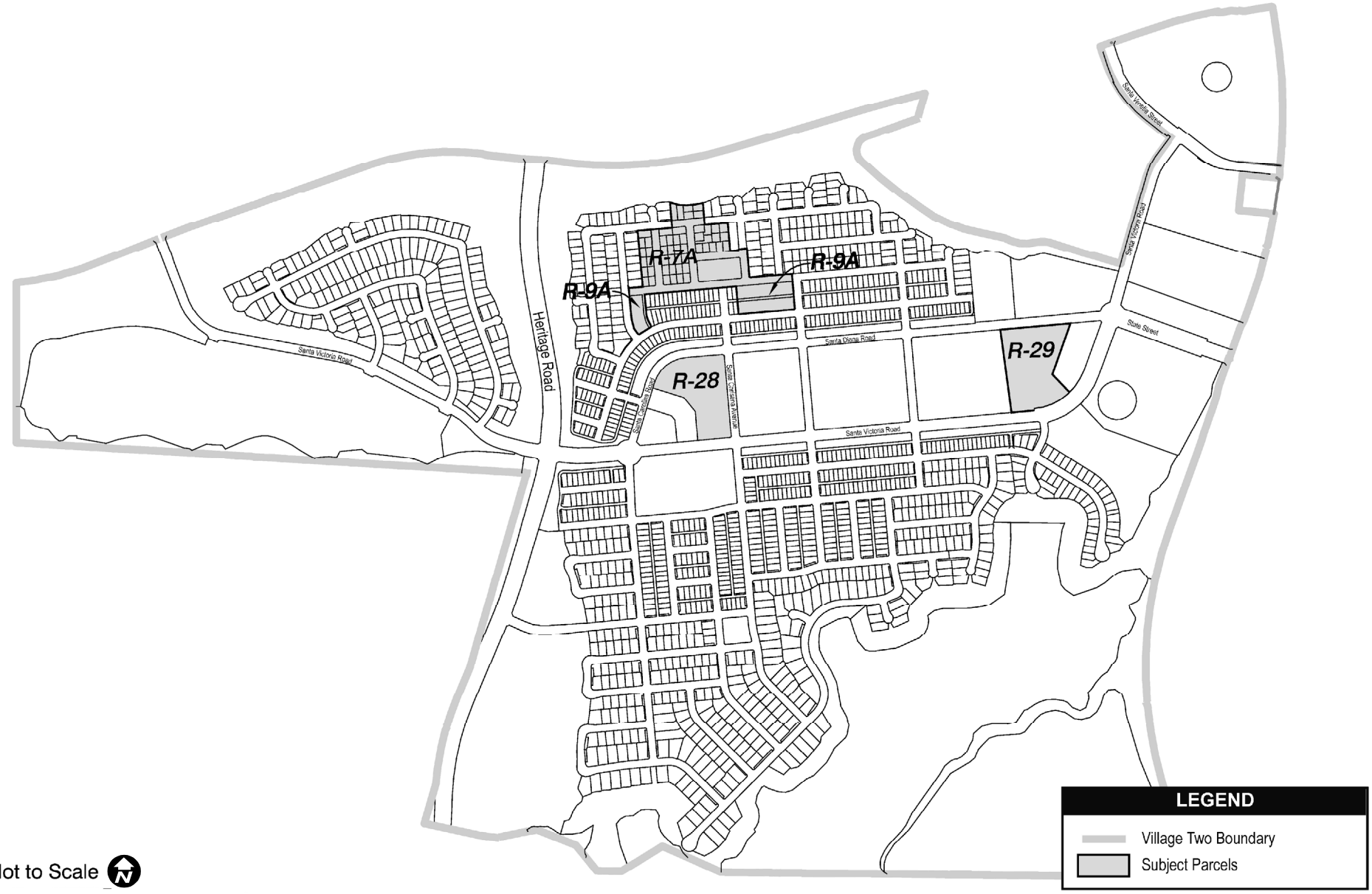

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SOURCE: HUNSAKER 2011

FIGURE 3

Project Site

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2.0 EXISTING CONDITIONS

2.1 Climate and Topography

The weather of the San Diego region, as in most of Southern California, is influenced by the Pacific Ocean and its semi-permanent high-pressure systems that result in dry, warm summers and mild, occasionally wet winters. The average temperature ranges (in degree Fahrenheit (°F)) from the mid 40s to the high 90s. Most of the region's precipitation falls from November to April, with infrequent (approximately 10%) precipitation during the summer. The average seasonal precipitation along the coast is approximately 10 inches; the amount increases with elevation as moist air is lifted over the mountains.

The topography in the San Diego region varies greatly, from beaches on the west to mountains and desert on the east; along with local meteorology, it influences the dispersal and movement of pollutants in the basin. The mountains to the east prohibit dispersal of pollutants in that direction and help trap them in inversion layers.

The interaction of ocean, land, and the Pacific High Pressure Zone maintains clear skies for much of the year and influences the direction of prevailing winds (westerly to northwesterly). Local terrain is often the dominant factor inland, and winds in inland mountainous areas tend to blow through the valleys during the day and down the hills and valleys at night.

2.2 Air Pollution Climatology

The project site is located within the San Diego Air Basin (SDAB or Basin) and is subject to the SDAPCD guidelines and regulations. The SDAB is one of fifteen air basins that geographically divide the State of California. The SDAB is currently classified as a federal nonattainment area for ozone (O_3) and a state nonattainment area for particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and O_3.

The SDAB lies in the southwest corner of California and comprises the entire San Diego region, covering 4,260 square miles, and is an area of high air pollution potential. The Basin experiences warm summers, mild winters, infrequent rainfalls, light winds, and moderate humidity. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

The Basin experiences frequent temperature inversions. Subsidence inversions occur during the warmer months as descending air associated with the Pacific High Pressure Zone meets cool marine air. The boundary between the two layers of air creates a temperature inversion that traps pollutants. The other type of inversion, a radiation inversion, develops on winter nights when air near the

ground cools by heat radiation and air aloft remains warm. The shallow inversion layer formed between these two air masses also can trap pollutants. As the pollutants become more concentrated in the atmosphere, photochemical reactions occur that produce ozone, commonly known as smog.

Light and daytime winds, predominately from the west, further aggravate the condition by driving air pollutants inland, toward the mountains. During the fall and winter, air quality problems are created due to carbon monoxide (CO) and oxides of nitrogen (NO_x) emissions. CO concentrations are generally higher in the morning and late evening. In the morning, CO levels are relatively high due to cold temperatures and the large number of motor vehicles traveling. High CO levels during the late evenings are a result of stagnant atmospheric conditions trapping CO in the area. Since CO is produced almost entirely from automobiles, the highest CO concentrations in the Basin are associated with heavy traffic. Nitrogen dioxide (NO_2) levels are also generally higher during fall and winter days.

Under certain conditions, atmospheric oscillation results in the offshore transport of air from the Los Angeles region to San Diego County. This often produces high O_3 concentrations, as measured at air pollutant monitoring stations within the County. The transport of air pollutants from Los Angeles to San Diego has also occurred within the stable layer of the elevated subsidence inversion, where high levels of O_3 are transported.

2.3 Air Quality Characteristics

Air quality varies as a direct function of the amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Air quality problems arise when the rate of pollutant emissions exceeds the rate of dispersion. Reduced visibility, eye irritation, and adverse health impacts upon those persons termed sensitive receptors are the most serious hazards of existing air quality conditions in the area. Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution, as identified by the California Air Resources Board (CARB), include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Sensitive receptors include residences, schools, playgrounds, child care centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes.

The proposed project site is currently vacant, and the nearest existing residences are located directly north of the project site across Olympic Parkway. Residences are currently being built within Village Two as well, adjacent to the project site. Additionally, Otay Ranch High School is located northeast of the project site.

3.0 POLLUTANTS AND EFFECTS

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive persons from illness or discomfort. Pollutants of concern include: O_3, NO_2, CO, sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$, and lead (Pb). These pollutants are discussed below.[1] In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants.

Ozone. O_3 is a colorless gas that is formed in the atmosphere when volatile organic compounds (VOCs), sometimes referred to as reactive organic gases (ROGs), and NO_x react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of VOCs and NO_x, the precursors of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation and ideal conditions occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

Nitrogen Dioxide. Most NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_x and are major contributors to O_3 formation. High concentrations of NO_2 can cause breathing difficulties and result in a brownish-red cast to the atmosphere with reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis and some increase in bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million by volume (ppm).

Carbon Monoxide. CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the project location, automobile exhaust accounts for the majority of CO emissions. CO is a non-reactive air pollutant

[1] The following descriptions of health effects for each of the criteria air pollutants associated with project construction and operations are based on the Environmental Protection Agency (EPA) Six Common Air Pollutants (EPA 2010a) and the CARB Glossary of Air Pollutant Terms (CARB 2011a) published information.

that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions; primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. The highest levels of CO typically occur during the colder months of the year when inversion conditions are more frequent. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Fine particulate matter, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_x), NO_x, and VOC. Inhalable or coarse particulate matter, or PM_{10}, is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances, such as Pb, sulfates, and nitrates, can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body.

Additionally, these substances can transport absorbed gases, such as chlorides or ammonium, into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

Lead. Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline, the manufacturing of batteries, paint, ink, ceramics, and ammunition and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phase-out of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emission sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance including intelligence quotient performance, psychomotor performance, reaction time, and growth.

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic noncancer health effects. A toxic substance released into the air is considered a toxic air contaminant (TAC). Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources such as automobiles; and area sources such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced either on short-term (acute) or long-term (chronic) exposure to a given TAC.

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4.0 REGULATORY SETTING

4.1 Federal

The federal Clean Air Act (CAA), passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The Environmental Protection Agency (EPA) is responsible for implementing most aspects of the CAA, including the setting of National Ambient Air Quality Standards (NAAQS) for major air pollutants, hazardous air pollutant standards, approval of state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric O_3 protection, and enforcement provisions. NAAQS are established for "criteria pollutants" under the CAA, which are O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The CAA requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a State Implementation Plan that demonstrates how those areas will attain the standards within mandated time frames.

4.2 State

The federal CAA delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts (AQMDs) and air pollution control districts (APCDs) at the regional and county levels. CARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for ensuring implementation of the California Clean Air Act (CCAA) of 1988, responding to the federal CAA, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS), which are more restrictive than the NAAQS, consistent with the CAA, which requires state regulations to be at least as restrictive as the federal requirements. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing

particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 2, Ambient Air Quality Standards.

Table 2
Ambient Air Quality Standards

Pollutant	Average Time	California Standards[1]	National Standards[2]	
		Concentration[3]	Primary[3,4]	Secondary[3,5]
O_3	1 hour	0.09 ppm (180 μg/m³)	—	Same as Primary Standard
	8 hour	0.070 ppm (137 μg/m³)	0.075 ppm (147 μg/m³)	
CO	8 hours	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	None
	1 hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	
NO_2	Annual Arithmetic Mean	0.030 ppm (57 μg/m³)	0.053 ppm (100 μg/m³)	Same as Primary Standard
	1 hour	0.18 ppm (339 μg/m³)	0.100 ppm (188 μg/m³)	
SO_2	24 hours	0.04 ppm (105 μg/m³)	—	—
	3 hours	—	—	0.5 ppm (1300 μg/m³)
	1 hour	0.25 ppm (655 μg/m³)	0.75 ppm (196 μg/m³)	—
PM_{10}	24 hours	50 μg/m³	150 μg/m³	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m³	—	
$PM_{2.5}$	24 hours	No Separate State Standard	35 μg/m³	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m³	15.0 μg/m³	
Lead[6]	30-day Average	1.5 μg/m³	—	—
	Calendar Quarter	—	1.5 μg/m³	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 μg/m³	
Hydrogen sulfide	1-hour	0.03 ppm	—	—
Vinyl chloride[6]	24-hour	0.01 ppm	—	—
Sulfates	24-hour	25 μg/m3	—	—
Visibility reducing particles	8-hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%	—	—

ppm= parts per million by volume
μg/m³ = micrograms per cubic meter
mg/m³= milligrams per cubic meter
Source: CARB 2011b

[1] California standards for O_3, CO, sulfur dioxide (1-hour and 24-hour), NO_2, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For NO_2 and SO_2, the standard is attained when the 3-year average of the 98th and 99th percentile, respectively, of the daily maximum 1-hour average at each monitor within an area does not exceed the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m³ is

Table 2 (Continued)

equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr.
Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[5] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[6] CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

4.3 Local

San Diego Air Pollution Control District

While CARB is responsible for the regulation of mobile emission sources within the state, local AQMDs and APCDs are responsible for enforcing standards and regulating stationary sources. The project is located within the SDAB and is subject to SDAPCD guidelines and regulations. In San Diego County, ozone and particulate matter are the pollutants of main concern, since exceedances of state ambient air quality standards for those pollutants are experienced here in most years. For this reason the SDAB has been designated as a nonattainment area for the state PM_{10}, $PM_{2.5}$, and ozone standards. The SDAB is also a federal ozone nonattainment area and a carbon monoxide maintenance area. The SDAB is currently in the process of being redesignated as a "serious" nonattainment area for ozone.

The SDAPCD and the San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The County Regional Air Quality Strategy (RAQS) was initially adopted in 1991, and is updated on a triennial basis (most recently in 2009). The RAQS outlines SDAPCD's plans and control measures designed to attain the state air quality standards for O_3. The RAQS relies on information from CARB and SANDAG, including mobile and area source emissions, as well as information regarding projected growth in the cities and San Diego County, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and SANDAG growth projections are based on population, vehicle trends, and land use plans developed by the cities and San Diego County as part of the development of their general plans.

As stated above, the SDAPCD is responsible for planning, implementing, and enforcing federal and state ambient standards in the SDAB. The following rules and regulations apply to all sources in the jurisdiction of SDAPCD:

- **SDAPCD Regulation IV: Prohibitions; Rule 51: Nuisance.** Prohibits the discharge from any source such quantities of air contaminants or other materials that cause or have a tendency to cause injury, detriment, nuisance, annoyance to people and/or the public, or damage to any business or property.
- **SDAPCD Regulation IV: Prohibitions; Rule 55: Fugitive Dust.** Regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions, including active operations, open storage piles, and inactive disturbed areas, as well as track-out and carry-out onto paved roads beyond a project site.
- **SDAPCD Regulation IV: Prohibitions; Rule 67.0: Architectural Coatings.** Requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

City of Chula Vista

Recently, the Chula Vista City Council adopted the new 2008 state Energy Code (Title 24) with an amendment requiring an increased energy efficiency standard. This amendment went into effect on February 26, 2010, as Section 15.26.030 of the Municipal Code. As required by this amendment, all building permits applied for and submitted on or after this date are subject to these increased energy efficiency standards. The increase in energy efficiency is a percentage above the new 2008 Energy Code and is dependent on climate zone and type of development proposed. The designation is as follows:

- New residential and nonresidential projects that fall within climate zone 7 must be at least 15% more energy efficient than the 2008 Energy Code. Climate zone 7 encompasses the western portion of the City Of Chula Vista (City of Chula Vista 2010).
- New low-rise residential projects (three-stories or less) that fall within climate zone 10 must be at least 20% more energy efficient than the 2008 Energy Code. New non-residential, high-rise residential or hotel/motel projects that fall within climate zone 10 must be at least 15% more energy efficient than the 2008 Energy Code. Climate zone 10 encompasses the easternmost portion of the City Of Chula Vista (City of Chula Vista 2010).

5.0 LOCAL AIR QUALITY

5.1 SDAB Attainment Designation

An area is designated in attainment when it is in compliance with the NAAQS and/or CAAQS. These standards are set by the EPA or CARB for the maximum level of a given air pollutant which can exist in the outdoor air without unacceptable effects on human health or the public welfare.

The criteria pollutants of primary concern that are considered in this air quality assessment include O_3, NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. Although there are no ambient standards for VOCs or NO_x, they are important as precursors to O_3.

The SDAB is designated as Former Subpart 1 (Basic) nonattainment for the 8-hour NAAQS for O_3. The SDAB is currently in the process of being redesignated as a "serious" nonattainment area for ozone despite the possibility of the SDAB achieving the original 1997 Federal 8-hour ozone standard in 2011. In 2009, the EPA proposed a "moderate" ozone nonattainment classification for the SDAB. Because the attainment deadline for "moderate" classification designation has since passed, the SDAB will be redesignated. A pending final rule for a "serious" nonattainment classification is expected during Summer 2011. The SDAB was designated in attainment for all other criteria pollutants under the NAAQS with the exception of PM_{10}, which was determined to be unclassifiable. The SDAB is currently designated nonattainment for $O_3$and particulate matter, PM_{10} and $PM_{2.5}$, under the CAAQS. It is designated attainment for CO, NO_2, SO_2, lead, and sulfates. Table 3, SDAB Attainment Classification summarizes San Diego County's federal and state attainment designations for each of the criteria pollutants.

Table 3
SDAB Attainment Classification

Pollutant	Federal Designation	State Designation
Ozone (1 hour)	Attainment*	Nonattainment
Ozone (8 hour)	Nonattainment (Subpart I/Basic)	Nonattainment
Carbon Monoxide	Attainment (Maintenance Area)	Attainment
PM_{10}	Unclassifiable**	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(no federal standard)	Attainment
Hydrogen Sulfide	(no federal standard)	Unclassified

Visibility-Reducing Particles	(no federal standard)	Unclassified

Source: SDAPCD 2007

* The federal 1-hour standard of 0.12 ppm was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in State Implementation Plans.

** At the time of designation, if the available data does not support a designation of attainment or nonattainment, the area is designated as unclassifiable.

5.2 Air Quality Monitoring Data

The SDAPCD operates a network of ambient air monitoring stations throughout San Diego County, which measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the CAAQS and the NAAQS. The SDAPCD monitors air quality conditions at ten locations throughout the Basin. The Chula Vista monitoring station is the nearest location to the project site where criteria pollutant concentrations are monitored. Ambient concentrations of pollutants from 2007 through 2009 are presented in Table 4, Ambient Air Quality Data. The number of days exceeding the AAQS are shown in Table 5, Frequency of Air Quality Standard Violations. Air quality within the project region is in compliance with both CAAQS and NAAQS for NO_2, CO, and SO_2.

Table 4
Ambient Air Quality Data
(ppm unless otherwise indicated)

Pollutant	Averaging Time	2007	2008	2009	Most Stringent Ambient Air Quality Standard	Monitoring Station [1]
O_3	8 hour	0.087	0.084	0.075	0.070	Chula Vista
	1 hour	0.105	0.107	0.098	0.09	
PM_{10}	Annual	26.1 µg/m³	26.7 µg/m³	26.2 µg/m³	20 µg/m³	Chula Vista
	24 hour	58.0 µg/m³	54.0 µg/m³	58.0 µg/m³	50 µg/m³	
$PM_{2.5}$	Annual	N/A	12.3 µg/m³	11.4 µg/m³	12 µg/m³	Chula Vista
	24 hour	77.8 µg/m³	32.9 µg/m³	43.7 µg/m³	35 µg/m³	
NO_2	Annual	0.015	0.015	0.013	0.030	Chula Vista
	1 hour	0.082	0.072	0.065	0.18 [2]	
CO	8 hour	2.24	1.87	1.43	9.0	Chula Vista
	1 hour [3]	3.1	2.0	N/A	20	
SO_2	Annual	0.002	0.002	0.002	0.030	Chula Vista
	24 hour	0.004	0.004	0.003	0.04	

Source: CARB 2011c; EPA 2011a
Data represent maximum values
Notes:
[1] Chula Vista – Monitoring Station located at 80 E. J Street, Chula Vista, California
[2] A new 1-hour NAAQS for NO_2 became effective in April 2010. Data reflect compliance with the 1-hour CAAQS
[3] Data were taken from EPA 2011a

Table 5
Frequency of Air Quality Standard Violations

Monitoring Site	Year	Number of Days Exceeding Standard					
		State 1-Hour Ozone	State 8-Hour Ozone	National 8-Hour Ozone	State 24-Hour PM_{10} [a]	National 24-Hour PM_{10} [a]	National 24-Hour $PM_{2.5}$
Chula Vista	2007	2	3	1	12.2 (2)	0	9.9 (3)
	2008	1	4	3	6.1 (1)	0	0
	2009	1	3	0	12.2 (2)	0	3.1 (1)

Source: CARB 2011c.

[a] Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and 3 days, respectively. Number of days exceeding the standards are mathematical estimates of the number of days concentrations would have been greater than the level of the standard had each day been monitored. The numbers in parentheses are the measured number of samples that exceeded the standard.

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6.0 THRESHOLDS OF SIGNIFICANCE

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines, which provides guidance that a project would have a significant environmental impact if it would:

1. Conflict with or obstruct the implementation of the applicable air quality plan;
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for O_3 precursors);
4. Expose sensitive receptors to substantial pollutant concentrations; or
5. Create objectionable odors affecting a substantial number of people.

Criteria Pollutants

The City of Chula Vista evaluates project emissions based on the quantitative emission thresholds established by the South Coast Air Quality Management District (SCAQMD) in its CEQA Air Quality Handbook (SCAQMD 1993). The SCAQMD sets forth quantitative emission significance thresholds below which a project would not have a significant impact on ambient air quality. It should be noted that the use of these significance thresholds is conservative, as the SCAQMD's significance thresholds were originally based on the South Coast Air Basin's extreme ozone nonattainment status for the 1-hour NAAQS, whereas the SDAB was designated as an attainment area for the 1-hour NAAQS. Project-related air quality impacts estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 6, City of Chula Vista Air Quality Significance Thresholds, are exceeded.

Table 6
City Of Chula Vista Air Quality Significance Thresholds

Pollutant	Construction	Operation
Criteria Pollutants Mass Daily Thresholds		
VOC	75 lbs/day	55 lbs/day
NO_x	100 lbs/day	55 lbs/day
CO	550 lbs/day	550 lbs/day
SO_x	150 lbs/day	150 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day

Source: SCAQMD CEQA Handbook (SCAQMD 1993) Revised March 2011
VOC – volatile organic compounds
NO_x – oxides of nitrogen
CO – carbon monoxide
SO_x – sulfur oxides
PM_{10} – particulate matter less than 10 microns
$PM_{2.5}$ – particulate matter less than 2.5 microns

For these pollutants, if emissions exceed the thresholds shown in Table 6, the project could have the potential to result in a cumulatively considerable net increase in these pollutants and thus could have a significant impact on the ambient air quality.

7.0 IMPACTS

7.1 Construction Impacts

Construction of the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation and, for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts. Fugitive dust (PM_{10} and $PM_{2.5}$) emissions would primarily result from grading and site preparation activities. NO_x and CO emissions would primarily result from the use of construction equipment and motor vehicles.

Emissions from the construction phase of the project were estimated through the use of emission factors from the URBEMIS 2007, Version 9.2.4, land use and air emissions model (Jones & Stokes 2007). For the purposes of modeling, it was assumed that the proposed project would commence in December 2011. Construction would include the following phases: fine grading (3 months), paving (2 months), and construction of 197 residential units (51 months including architectural coatings). Total construction is expected to take approximately 4.5 years. For the analysis, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week (22 days per month), during project construction. URBEMIS model assumptions for construction equipment were used in calculating construction emissions as equipment and machinery mix would be typical of residential development. Additional details of the construction schedule and equipment are included in Appendix A. The equipment mix is meant to represent a reasonably conservative estimate of construction activity.

The proposed project is subject to SDAPCD Rule 55 – Fugitive Dust Control. This requires that the project take steps to restrict visible emissions of fugitive dust beyond the property line. Compliance with Rule 55 would limit any fugitive dust (PM_{10} and $PM_{2.5}$) that may be generated during grading and construction activities. To account for dust control measures in the calculations, it was assumed that the active sites would be watered at least two times daily, resulting in an approximately 55% reduction of particulate matter.

Table 7, Estimated Maximum Daily Construction Emissions, shows the estimated maximum daily construction emissions associated with the construction phase of the proposed project.

Table 7
Estimated Maximum Daily Construction Emissions
(pounds/day)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Proposed Project Emissions						
2011	2.86	23.49	12.98	0.00	12.49	3.44
2012	14.06	22.00	40.05	0.04	12.39	3.35
2013	13.70	17.99	37.52	0.04	1.29	1.08
2014	13.37	16.62	35.16	0.04	1.17	0.97
2015	13.06	15.28	32.99	0.04	1.09	0.90
2016	12.77	14.10	31.06	0.04	1.00	0.81
Maximum Daily Emissions	*14.06*	*23.49*	*40.05*	*0.04*	*12.49*	*3.44*
City of Chula Vista Threshold	*75*	*100*	*550*	*150*	*150*	*55*
Threshold Exceeded?	No	No	No	No	No	No

Source: URBEMIS 2007 Version 9.2.4. See Appendix A for complete results.

As shown, daily construction emissions would not exceed the City's significance thresholds for VOC, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. As such, construction of the proposed project would result in a less than significant impact.

7.2 Operational Emissions

Following the completion of construction activities, the proposed project would generate VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$ emissions from project land uses, as well as mobile and stationary sources including vehicular traffic from residents, space heating and cooling, water heating, and fireplace (hearth) use.

The proposed project would impact air quality through the vehicular traffic generated by project residents. According to the project's Traffic Impact Study (Fehr and Peers 2011), total project-generated daily traffic is estimated to be 1,674 trips per day, based on 10 trips per unit per day for the 49 single family units, and 8 trips per unit per day for the 148 multi-family units. The URBEMIS 2007 model was utilized to estimate daily emissions from proposed vehicular sources (refer to Appendix A). URBEMIS 2007 default data, including temperature, trip characteristics, variable start information, emissions factors, and trip distances, were conservatively used for the model inputs. Project-related traffic was assumed to be comprised of a mixture of vehicles in accordance with the model outputs for traffic. Emission factors representing the vehicle mix and emissions for 2016 (full buildout) were used to estimate emissions.

In addition to estimating mobile source emissions, the URBEMIS 2007 model was also used to estimate emissions from the project area stationary sources, which include natural gas

appliances, hearths, landscaping (which would not produce winter emissions), consumer products, and architectural coatings. All residential units would be constructed with natural gas fireplaces.

The present estimation of proposed operational emissions is based upon typical residential and retail uses, and the analysis is considered a reliable estimate of the project's likely emissions. Table 8, Estimated Daily Maximum Operational Emissions, presents the maximum daily emissions associated with the operation of the proposed project after all phases of construction have been completed. The values shown are the maximum summer or winter daily emissions results from URBEMIS 2007. Complete details of the emissions calculations are provided in Appendix A of this document.

Table 8
Estimated Daily Maximum Operational Emissions – 2016
(pounds/day)

Proposed Project Emissions	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Summer						
Motor Vehicles	9.43	11.07	107.79	0.14	24.68	4.76
Area Sources	14.22	2.57	9.84	0.00	0.02	0.02
Total	23.65	13.64	117.63	0.14	24.70	4.78
City of Chula Vista Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Threshold Exceeded?	No	No	No	No	No	No
Winter						
Motor Vehicles	9.54	16.19	113.03	0.12	24.68	4.76
Area Sources	12.73	4.10	1.75	0.01	0.13	0.13
Total	22.27	20.29	114.78	0.13	24.81	4.89
City of Chula Vista Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Threshold Exceeded?	No	No	No	No	No	No

Source: URBEMIS 2007 Version 9.2.4. See Appendix A for complete results.
"Summer" emissions are representative of the conditions that may occur during the ozone season (May 1 to October 31) and "Winter" emissions, are representative of the conditions that may occur during the balance of the year (November 1 to April 30)

As shown, daily area source and operational emissions would not exceed the significance thresholds for VOC, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. As such, the proposed project would result in less than significant operational impacts to air quality.

7.3 Cumulative Impacts

In analyzing cumulative impacts from the proposed project, the analysis must specifically evaluate a project's contribution to the cumulative increase in pollutants for which the SDAB is

designated as nonattainment for the CAAQS and NAAQS. If the proposed project does not exceed thresholds and is determined to have less than significant project-specific impacts, it may still contribute to a significant cumulative impact on air quality if the emissions from the project, in combination with the emissions from other proposed or reasonably foreseeable future projects, are in excess of established thresholds. However, the project would only be considered to have a significant cumulative impact if the project's contribution accounts for a significant proportion of the cumulative total emissions (i.e., it represents a "cumulatively considerable contribution" to the cumulative air quality impact).

The SDAB has been designated as a federal nonattainment area for O_3, and a state nonattainment area for O_3, PM_{10}, and $PM_{2.5}$. PM_{10} and $PM_{2.5}$ emissions associated with construction generally result in near-field impacts. The nonattainment status is the result of cumulative emissions from all sources of these air pollutants and their precursors within the SDAB. As discussed in Section 7.1, the emissions of all criteria pollutants, including PM_{10} and $PM_{2.5}$, would be well below the significance levels. Construction would be short-term and consistent with the size and scale of the proposed project. Construction activities required for the implementation of the proposed project would be considered typical of residential development and would not result in significant impacts to air quality. While it is likely that construction associated with several other projects will occur in the general vicinity of the proposed project, the project's contribution to the net cumulative emissions would be minimal due to construction practices that would keep emissions well below the significance thresholds for these pollutants. Therefore, the project's contribution to cumulative construction emissions would be less than significant.

As stated in Section 4.3, the RAQS relies on SANDAG growth projections based on population, vehicle trends, and land use plans developed by the cities and by the county as part of the development of their general plans. As such, projects that propose development that is consistent with the growth anticipated by local plans would be consistent with the RAQS. SANDAG's growth projections for San Diego County in 2009 (year the most recent RAQS was adopted) called for a total population of 3,185,462 (SANDAG 2011). According to the California Department of Finance, the population of San Diego County as of January 1, 2011 was 3,118,876 (Department of Finance 2011). Because the current population in San Diego County has not kept up with the projected population that was used as the basis for the RAQS, the addition of 197 residential units (approximately 619 new residents) to the San Diego Air Basin as part of the proposed project would be accommodated in the regional population forecast used to prepare the 2009 RAQS. As a result, while the proposed project was not included in the underlying growth estimates used as the basis for the RAQS update, it would not conflict with or obstruct implementation of the RAQS. Furthermore, the project would be consistent with the stationary and mobile source measures included in the RAQS for the purposes of reducing

emissions, such as further control of architectural coatings. Thus, the proposed project would be consistent at a regional level with the RAQS and would not result in a cumulatively considerable contribution to regional O_3 concentrations.

For these reasons, implementation of the proposed project would not result in a significant cumulative impact to air quality.

7.4 Toxic Air Contaminants

The greatest potential for toxic air contaminant (TAC) emissions during construction would be diesel particulate emissions from heavy equipment operations and heavy-duty trucks and the associated health impacts to sensitive receptors. The proposed project site is currently vacant; however, the nearest residences are located approximately 800 feet north of the project site, across Olympic Parkway. Residences are currently being built within Village Two as well, adjacent to the project site. Additionally, Otay Ranch High School is located northeast of the project site.

Health effects from carcinogenic air toxics are usually described in terms of cancer risk. The SDAPCD recommends an incremental cancer risk threshold of 10 in a million. "Incremental Cancer Risk" is the likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 70-year lifetime will contract cancer based on the use of standard risk-assessment methodology. The project would not require the extensive use of heavy-duty construction equipment, which is subject to a CARB Airborne Toxics Control Measure (ATCM) for in-use diesel construction equipment to reduce diesel particulate emissions, and would not involve extensive use of diesel trucks, which are also subject to an ATCM. Total construction of the proposed project would last for approximately 4.5 years, after which time project-related TAC emissions would cease. A majority of the TAC emissions would occur during site grading activities from large grading equipment. Because the project site has already been mass graded, the grading phase would only last for 3 months and would consist solely of fine site grading. Thus, the proposed project would not result in a long-term (i.e., 70 years) source of TAC emissions. No residual TAC emissions and corresponding cancer risk are anticipated after construction. As such, the exposure of project-related TAC emission impacts to sensitive receptors (including Otay Ranch High School and nearby residential development) during construction would be less than significant.

7.5 Odors

Odors would be generated from vehicles and/or equipment exhaust emissions during construction of the proposed project. Odors produced during construction would be attributable

to concentrations of unburned hydrocarbons from tailpipes of construction equipment and architectural coatings. Such odors are temporary and generally occur at magnitudes that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be considered less than significant.

Land uses and industrial operations that are associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project entails residential and retail uses and would not result in the creation of a land use that is commonly associated with odors. Therefore, project operations would result in a less than significant odor impact.

The proposed project will be constructed in the vicinity of the Otay Landfill. This facility will occasionally produce odors that can be detected outside of the landfill boundary. As indicated in the Final Environmental Impact Report (EIR) for the Otay Ranch Village Two, Three and a Portion of Four SPA Plan (City of Chula Vista 2006), the Otay Landfill has no history of odor complaints and uses a flare to dispose of excess landfill gas. As a result, odor impacts from the Otay Landfill on the proposed project would be considered less than significant.

8.0 GLOBAL CLIMATE CHANGE

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer).

8.1 The Greenhouse Effect and Greenhouse Gases

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). The greenhouse effect traps heat in the troposphere through a three-fold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit this long-wave radiation into space and toward the Earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect. Principal GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, and water vapor (H_2O). Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted to the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results mostly from off-gassing associated with agricultural practices and landfills. Man-made GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3), which are associated with certain industrial products and processes (CAT 2006).

The greenhouse effect is a natural process that contributes to regulating the earth's temperature. Without it, the temperature of the Earth would be about 0°F (−18°C) instead of its present 57°F (14°C). Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect (National Climatic Data Center 2009).

The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of a gas or aerosol to trap heat in the atmosphere, known as its global warming potential (GWP). The GWP varies between GHGs; for example, the GWP of CH_4 is 21, and the GWP of N_2O is 310. Total GHG emissions are expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG gas emissions are typically measured in terms of pounds or tons of "CO_2 equivalent" (CO_2E).

According to CARB, some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high O_3 days, more large forest fires, and more drought years (CARB 2006). Several recent studies have attempted to

explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts.

The primary effect of global climate change has been a rise in average global tropospheric temperature of 0.2°C per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming would occur, which would induce further changes in the global climate system during the current century. Changes to the global climate system and ecosystems and to California would include, but would not be limited to:

- The loss of sea ice and mountain snow pack resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007)
- Rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps, the Greenland and Antarctic ice sheets (IPCC 2007)
- Changes in weather that includes, widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic and aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007)
- Decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 70% to as much as 90% over the next 100 years (CAT 2006)
- Increase in the number of days conducive to O_3 formation by 25% to 85% (depending on the future temperature scenario) in high O_3 areas of Los Angeles and the San Joaquin Valley by the end of the 21st century (CAT 2006)
- High potential for erosion of California's coastlines and sea water intrusion into the Delta and levee systems due to the rise in sea level (CAT 2006).

8.2 Regulatory Setting

Federal Activities

Massachusetts vs. EPA. To date, the EPA has not regulated GHGs under the CAA based on the assertion that "(1) the Act does not authorize it to issue mandatory regulations to address global

climate change, and (2) even if it had the authority to set GHG emission standards, it would have been unwise to do so at that time because a causal link between GHGs and the increase in global surface air temperatures was not unequivocally established."[2] In *Massachusetts v. EPA*, however, the Supreme Court held that EPA has the statutory authority under Section 202 of the CAA to regulate GHGs from new motor vehicles because GHGs meet the CAA definition of an air pollutant.[3] The court did not hold that the EPA was required to regulate GHG emissions; however, it indicated that the agency must decide whether GHGs from motor vehicles cause or contribute to air pollution that is reasonably anticipated to endanger public health or welfare. Upon the final decision, President Bush signed Executive Order 13432 on May 14, 2007, directing the EPA, along with the Departments of Transportation, Energy, and Agriculture, to initiate a regulatory process that responds to the Supreme Court's decision.

In *Massachusetts v. EPA*, the Supreme Court directed the Administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the Administrator is required to follow the language of Section 202(a) of the CAA. On December 7, 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- The Administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the endangerment finding.
- The Administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the cause or contribute finding.

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

Energy Independence and Security Act. On December 19, 2007, President Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the Act would do the following, which would aid in the reduction of national GHG emissions:

[2] Massachusetts et al. v. Environmental Protection Agency et al., 549 U.S. 497 (2007).
[3] Ibid.

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022
2. Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by Model Year 2020, directs National Highway Traffic Safety Administration to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks
3. Prescribe or revise standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

EPA and NHTSA Joint Final Rule for Vehicle Standards. On April 1, 2010, the U.S. EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a joint final rule to establish a national program consisting of new standards for light-duty vehicles model years 2012 through 2016. The joint rule is intended to reduce GHG emissions and improve fuel economy. EPA is finalizing the first-ever national GHG emissions standards under the Clean Air Act, and NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act (EPA 2010b). This final rule follows the EPA and Department of Transportation's (DOT) joint proposal on September 15, 2009, and is the result of the President Obama's May 2009 announcement of a national program to reduce greenhouse gases and improve fuel economy (EPA 2011b). This final rule will become effective 60 days after publication in the Federal Register (EPA and NHTSA 2010).

The EPA GHG standards require new passenger cars, light-duty trucks, and medium-duty passenger vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg) if the automotive industry were to meet this CO_2 level all through fuel economy improvements. The CAFE standards for passenger cars and light trucks will be phased in between 2012 and 2016, with the final standards equivalent to 37.8 mpg for passenger cars and 28.8 mpg for light trucks, resulting in an estimated combined average of 34.1 mpg. Together, these standards will cut greenhouse gas emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program. The rules will simultaneously reduce greenhouse gas emissions, improve energy security, increase fuel savings, and provide clarity and predictability for manufacturers (EPA 2011b).

State of California

AB 1493. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set the GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22% in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term (2013–2016) standards will result in a reduction of about 30%.

Before these regulations could go into effect, the EPA had to grant California a waiver under the federal CAA, which ordinarily pre-empts state regulation of motor vehicle emission standards. The waiver was granted by Lisa Jackson, the EPA administrator, on June 30, 2009. On March 29, 2010, the CARB Executive Officer approved revisions to the motor vehicle GHG standards to harmonize the state program with the national program for 2012 to 2016 model years (see "EPA and NHTSA Joint Final Rule for Vehicle Standards" above). The revised regulations became effective on April 1, 2010.

Senate Bill 1078. Approved by Governor Davis in September 2002, Senate Bill 1078 (SB 1078, Sher) established the Renewal Portfolio Standard program, which requires an annual increase in renewable generation by the utilities equivalent to at least 1% of sales, with an aggregate goal of 20% by 2017. This goal was subsequently accelerated, requiring utilities to obtain 20% of their power from renewable sources by 2010 (see SB 107 and Executive Orders S-14-08 and S-21-09.)

Executive Order S-3-05. In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80% below 1990 levels by 2050. The Secretary of CalEPA is required to coordinate efforts of various agencies to collectively and efficiently reduce GHGs. Representatives from several state agencies comprise the Climate Action Team. The Climate Action Team is responsible for implementing global warming emissions reduction programs. The Climate Action Team fulfilled its report requirements through the March 2006 Climate Action Team Report to Governor Schwarzenegger and the legislature (CAT 2006). A second draft biennial report was released in April 2009.

The 2009 Draft Climate Action Team Report (CAT 2009) expands on the policy oriented in the 2006 assessment. The 2009 report provides new information and scientific findings regarding the development of new climate and sea-level projections using new information and tools that have recently become available and evaluates climate change within the context of broader soil changes, such as land use changes and demographics. The 2009 report also identifies the need for additional research in several different aspects that affect climate change in order to support effective climate change strategies. The aspects of climate change that were discussed that need future research include vehicle and fuel technologies, land use and smart growth, electricity and natural gas, energy efficiency, renewable energy and reduced carbon energy sources, low GHG technologies for other sectors, carbon sequestration, terrestrial sequestration, geologic sequestration, economic impacts and considerations, social science, and environmental justice.

SB 107. Approved by Governor Schwarzenegger on September 26, 2006, SB 107 (Simitian) requires investor-owned utilities such as Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric, to generate 20% of their electricity from renewable sources by 2010. Previously, state law required that this target be achieved by 2017 (see SB 1078).

AB 32. In furtherance of the goals established in Executive Order S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. The GHG emissions limit is equivalent to the 1990 levels, which are to be achieved by 2020.

CARB has been assigned to carry out and develop the programs and requirements necessary to achieve the goals of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 allows CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

The first action under AB 32 resulted in the adoption of a report listing early action GHG emission reduction measures on June 21, 2007. The early actions include three specific GHG control rules. On October 25, 2007, CARB approved an additional six early action GHG reduction measures under AB 32. The original three adopted early action regulations meeting the narrow legal definition of “discrete early action GHG reduction measures” consist of:

1. A low-carbon fuel standard to reduce the “carbon intensity” of California fuels

2. Reduction of refrigerant losses from motor vehicle air conditioning system maintenance to restrict the sale of "do-it-yourself" automotive refrigerants
3. Increased methane capture from landfills to require broader use of state-of-the-art methane capture technologies.

The additional six early action regulations, which were also considered "discrete early action GHG reduction measures," consist of:

1. Reduction of aerodynamic drag, and thereby fuel consumption, from existing trucks and trailers through retrofit technology
2. Reduction of auxiliary engine emissions of docked ships by requiring port electrification
3. Reduction of perfluorocarbons from the semiconductor industry
4. Reduction of propellants in consumer products (e.g., aerosols, tire inflators, and dust removal products)
5. Require that all tune-up, smog check and oil change mechanics ensure proper tire inflation as part of overall service in order to maintain fuel efficiency
6. Restriction on the use of SF_6 from non-electricity sectors if viable alternatives are available.

As required under AB 32, on December 6, 2007, CARB approved the 1990 GHG emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 million metric tons CO_2E. In addition to the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of GHGs for large facilities that account for 94% of GHG emissions from industrial and commercial stationary sources in California. About 800 separate sources that fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and other industrial sources that emit carbon dioxide in excess of specified thresholds.

On December 11, 2008, CARB approved the *Climate Change Proposed Scoping Plan: A Framework for Change* (Scoping Plan; CARB 2008) to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team early actions and additional GHG reduction measures by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. Additional development of these measures and

adoption of the appropriate regulations will occur over the next 2 years, becoming effective by January 1, 2012.

The key elements of the Scoping Plan include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards
- Achieving a statewide renewables energy mix of 33%
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State of California's long term commitment to AB 32 implementation.

SB 1368. In September 2006, Governor Schwarzenegger signed SB 1368, which requires the California Energy Commission (CEC) to develop and adopt regulations for GHG emissions performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the California Public Utilities Commission (CPUC). This effort will help to protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low or lower than new combined-cycle natural gas plants, by requiring imported electricity to meet GHG performance standards in California and requiring that the standards be developed and adopted in a public process.

Executive Order S-1-07. Issued on January 18, 2007, Executive Order S-1-07 sets a declining Low Carbon Fuel Standard (LCFS) for GHG emissions measured in CO_2-equivalent gram per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production

of biofuels, including those from alternative sources such as algae, wood, and agricultural waste. In addition, the LCFS would drive the availability of plug-in hybrid, battery electric, and fuel-cell power motor vehicles. The LCFS is anticipated to replace 20% of the fuel used in motor vehicles with alternative fuels by 2020.

SB 97. In August 2007, the legislature enacted SB 97 (Dutton), which directs the Governor's Office of Planning and Research (OPR) to develop guidelines under California Environmental Quality Act (CEQA) for the mitigation of GHG emissions. OPR is to develop proposed guidelines by July 1, 2009, and the Natural Resources Agency is directed to adopt guidelines by January 1, 2010. On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the State CEQA Guidelines.

On June 19, 2008, OPR issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents (OPR 2008). The advisory indicated that a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities, should be identified and estimated. The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures that are necessary to reduce GHG emissions to a less than significant level.

On April 13, 2009, OPR submitted to the Natural Resources Agency its proposed amendments to the state CEQA Guidelines relating to GHG emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting the proposed amendments, starting the public comment period.

The Natural Resources Agency adopted CEQA Guidelines Amendments on December 30, 2009, and transmitted them to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative law completed its review and filed the amendments with the secretary of state. The amendments became effective on March 18, 2010. The amended guidelines establish several new CEQA requirements concerning the analysis of GHGs, including the following:

- Requiring a lead agency to "make a good faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project" (Section 15064(a))
- Providing a lead agency with the discretion to determine whether to use quantitative or qualitative analysis or performance standards to determine the significance of greenhouse gas emissions resulting from a particular project (Section 15064.4(a))
- Requiring a lead agency to consider the following factors when assessing the significant impacts from greenhouse gas emissions on the environment:

- The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. (Section 15064.4(b))
- Allowing lead agencies to consider feasible means of mitigating the significant effects of greenhouse gas emissions, including reductions in emissions through the implementation of project features or off-site measures, including offsets that are not otherwise required (Section 15126.4(c)).

The amended guidelines also establish two new guidance questions regarding GHG emissions in the Environmental Checklist set forth in CEQA Guidelines Appendix G:

- Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The adopted amendments do not establish a GHG emission threshold, and instead allow a lead agency to develop, adopt, and apply its own thresholds of significance or those developed by other agencies or experts.[4] The Natural Resources Agency also acknowledges that a lead agency may consider compliance with regulations or requirements implementing AB 32 in determining the significance of a project's GHG emissions.[5]

SB 375. In August 2008, the legislature passed and on September 30, 2008, Governor Schwarzenegger signed SB 375 (Steinberg), which addresses GHG emissions associated with the transportation section through regional transportation and sustainability plans. By September 30, 2010, CARB will assign regional GHG reduction targets for the automobile and

[4] "The CEQA Guidelines do not establish thresholds of significance for other potential environmental impacts, and SB 97 did not authorize the development of a statement threshold as part of this CEQA Guidelines update. Rather, the proposed amendments recognize a lead agency's existing authority to develop, adopt and apply their own thresholds of significance or those developed by other agencies or experts" (California Natural Resources Agency 2009, p. 84).

[5] "A project's compliance with regulations or requirements implementing AB 32 or other laws and policies is not irrelevant. Section 15064.4(b)(3) would allow a lead agency to consider compliance with requirements and regulations in the determination of significance of a project's greenhouse gas emissions" (California Natural Resources Agency 2009, p. 100).

light truck sector for 2020 and 2035. The targets are required to consider the emission reductions associated with vehicle emission standards (see SB 1493), the composition of fuels (see Executive Order S-1-07), and other CARB-approved measures to reduce GHG emissions. Regional metropolitan planning organizations will be responsible for preparing a Sustainable Communities Strategy within the Regional Transportation Plan. The goal of the Sustainable Communities Strategy is to establish a development plan for the region, which, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If a Sustainable Communities Strategy is unable to achieve the GHG reduction target, a metropolitan planning organization must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies. SB 375 provides incentives for streamlining CEQA requirements by substantially reducing the requirements for "transit priority projects," as specified in SB 375, and eliminating the analysis of the impacts of certain residential projects on global warming and the growth-inducing impacts of those projects when the projects are consistent with the Sustainable Communities Strategy or Alternative Planning Strategy. On September 23, 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations (MPOs). The targets for the San Diego Association of Governments are a 7% reduction in emissions per capita by 2020 and a 13% reduction by 2035. Achieving these goals through adoption of a Sustainable Communities Strategy will be the responsibility of the MPOs.

Executive Order S-13-08. Governor Schwarzenegger issued Executive Order S-13-08 on November 14, 2008. The Executive Order is intended to hasten California's response to the impacts of global climate change, particularly sea level rise. It directs state agencies to take specified actions to assess and plan for such impacts. It directs the Resource Agency, in cooperation with the California Department of Water Resources, CEC, California's coastal management agencies, and the Ocean Protection Council to request the National Academy of Sciences to prepare a Sea Level Rise Assessment Report by December 1, 2010. The Ocean Protection Council, California Department of Water Resources, and CEC, in cooperation with other state agencies are required to conduct a public workshop to gather information relevant to the Sea Level Rise Assessment Report. The Business, Transportation, and Housing Agency was ordered to assess the vulnerability of the state's transportation systems to sea level rise within 90 days of the order. The OPR and the Resources Agency are required to provide land use planning guidance related to sea level rise and other climate change impacts. The order also requires the other state agencies to develop adaptation strategies by June 9, 2009, to respond to the impacts of global climate change that are predicted to occur over the next 50 to 100 years. A discussion draft adaptation strategies report was released in August 2009, and the final adaption strategies report was issued in December 2009. To assess the state's vulnerability, the report summaries

key climate change impacts to the state for the following areas: public health, ocean and coastal resources, water supply and flood protection, agriculture, forestry, biodiversity and habitat, and transportation and energy infrastructure. The report then recommends strategies and specific responsibilities related to water supply, planning and land use, public health, fire protection, and energy conservation.

Executive Order S-14-08. On November 17, 2008, Governor Schwarzenegger issued Executive Order S-14-08. This Executive Order focuses on the contribution of renewable energy sources to meet the electrical needs of California while reducing the GHG emissions from the electrical sector. The governor's order requires that all retail suppliers of electricity in California serve 33% of their load with renewable energy by 2020. Furthermore, the order directs state agencies to take appropriate actions to facilitate reaching this target. The Resources Agency, through collaboration with the CEC and Department of Fish and Game, is directed to lead this effort. Pursuant to a Memorandum of Understanding between the CEC and Department of Fish and Game creating the Renewable Energy Action Team, these agencies will create a "one-stop" process for permitting renewable energy power plants.

Executive Order S-21-09. On September 15, 2009, Governor Schwarzenegger issued Executive Order S-21-09. This Executive Order directed CARB to adopt a regulation consistent with the goal of Executive Order S-14-08 by July 31, 2010. CARB is further directed to work with the CPUC and CEC to ensure that the regulation builds upon the Renewable Portfolio Standard program and is applicable to investor-owned utilities, publicly owned utilities, direct access providers, and community choice providers. Under this order, CARB is to give the highest priority to those renewable resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health and that can be developed most quickly in support of reliable, efficient, cost-effective electricity system operations. On September 23, 2010, CARB adopted regulations to implement a "Renewable Electricity Standard," which would achieve the goal of the executive order with the following intermediate and final goals: 20% for 2012–2014; 24% for 2015–2017; 28% for 2018–2019; 33% for 2020 and beyond. Under the regulation, wind; solar; geothermal; small hydroelectric; biomass; ocean wave, thermal, and tidal; landfill and digester gas; and biodiesel would be considered sources of renewable energy. The regulation would apply to investor-owned utilities and public (municipal) utilities.

Local Activities

San Diego County Greenhouse Gas Inventory

A regional GHG inventory was prepared by the University of San Diego School of Law's Energy Policy Initiative Center (University of San Diego 2008). This San Diego County

Greenhouse Gas Inventory (SDCGHGI) consists of a detailed inventory that takes into account the unique characteristics of the region in calculating emissions. The study finds that emissions of GHGs must be reduced by 33% below business as usual in order for San Diego County to achieve 1990 emission levels by 2020.

City of Chula Vista

The City of Chula Vista has developed a number of strategies and plans aimed at improving air quality. The City is a part of the Cities for Climate Protection Program, which is headed by the International Council of Local Environmental Initiatives (ICLEI). In November 2002, Chula Vista adopted the CO_2 Reduction Plan in order to lower the community's major greenhouse gas emissions, strengthen the local economy, and improve the global environment. The CO_2 Reduction Plan focuses on reducing fossil fuel consumption and decreasing reliance on power generated by fossil fuels, which would have a corollary effect in the reduction of air pollutant emissions into the atmosphere. The following 20 action measures have been proposed within the plan in order to achieve this goal:

1. Municipal clean fuel vehicle purchases
2. Green power
3. Municipal clean fuel demonstration project
4. Telecommuting and telecenters
5. Municipal building upgrades and trip reduction
6. Enhanced pedestrian connections to transit
7. Increased housing density near transit
8. Site design with transit orientation
9. Increased land use mix
10. Green Power public education program
11. Site design with pedestrian/bicycle orientation
12. Bicycle integration with transit and employment
13. Bicycle lanes, paths, and routes
14. Energy efficient landscaping
15. Solar pool heating
16. Traffic signal and system upgrades
17. Student transit subsidy
18. Energy efficient building program
19. Municipal Life-Cycle purchasing standards
20. Increased employment density near transit.

More recently, the Chula Vista City Council adopted the new 2008 state Energy Code (Title 24) with an amendment requiring an increased energy efficiency standard. This amendment went into effect on February 26, 2010, as Section 15.26.030 of the Municipal Code. As required by this amendment, all building permits applied for and submitted on or after this date are subject to these increased energy efficiency standards. The increase in energy efficiency is a percentage

above the new 2008 Energy Code and is dependent on climate zone and type of development proposed. The designation is as follows:

- New residential and nonresidential projects that fall within climate zone 7 must be at least 15% more energy efficient than the 2008 Energy Code. Climate zone 7 encompasses the western portion of the City Of Chula Vista (City of Chula Vista 2010).
- New low-rise residential projects (three-stories or less) that fall within climate zone 10 must be at least 20% more energy efficient than the 2008 Energy Code. New non-residential, high-rise residential or hotel/motel projects that fall within climate zone 10 must be at least 15% more energy efficient than the 2008 Energy Code. Climate zone 10 encompasses the easternmost portion of the City Of Chula Vista (City of Chula Vista 2010).

Additionally, per Section 15.12 of the City's Municipal Code, all new residential construction, remodels, additions, and alterations must provide a schedule of plumbing fixture fittings that will reduce the overall use of potable water by 20% (City of Chula Vista 2010).

8.3 GHG Emissions and CEQA

GHG emissions contributing to global climate change have only recently been addressed in CEQA documents, such that CEQA and case law do not provide much guidance relative to their assessment. CEQA does, however, provide guidance regarding topics such as climate change in Guidelines Section 15144, Forecasting. Section 15144 notes that preparation of an environmental impact analysis document necessarily involves some degree of forecasting. While forecasting the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can.

Guidelines for the Determination of Significance

The State of California has developed guidelines to address the significance of climate change impacts based on Appendix G of the CEQA Guidelines, which provides guidance that a project would have a significant environmental impact if it would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Neither the State of California nor the SDAPCD has adopted emission-based thresholds for GHG emissions under CEQA. OPR's Technical Advisory titled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to a significant, cumulative climate change impact" (OPR 2008, p. 4). Furthermore, the advisory document indicates in the third bullet item on page 6 that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice."

At this time, the state has established the following goals for reduction of GHG emissions:

- 2000 levels by 2010 (11% below business as usual)
- 1990 levels by 2020 (25% below business as usual)

A general target of 20% below business as usual has been established for the purposes of assessing operational GHG emissions of projects in the City of Chula Vista. This reduction is considered to be an appropriate midpoint between the 2010 and 2020 targets set forth in AB 32. Additionally, consistent with Section 15.26.030 of the City's Municipal Code, new residential projects that fall within climate zone 7 must be at least 15% more energy efficient than the 2008 Energy Code. Therefore, a 15% reduction from business as usual would ensure consistency with the City's Municipal Code, where "business as usual" is considered to be development according to the energy efficiency standards established in the 2005 Energy Code standards. Importantly, this threshold is only applicable to operational emissions.

Construction Emissions

GHG emissions would be associated with the construction phase of the proposed project through use of construction equipment and vehicle trips. Emissions of CO_2 were estimated using the URBEMIS 2007, Version 9.2.4, land use and air emissions model (Jones & Stokes 2007). The model results were adjusted to estimate CH_4 and N_2O emissions in addition to CO_2. The CO_2 emissions from off-road equipment and vehicles and delivery trucks, which are assumed by URBEMIS 2007 to be diesel fueled, were adjusted by a factor derived from the relative CO_2, CH_4, and N_2O for diesel fuel as reported in the California Climate Action Registry's (CCAR) *General Reporting Protocol* (CCAR 2009) for transportation fuels and the global warming potential for each GHG to estimate the emissions in units of CO_2E. The CO_2 emissions

associated with construction worker trips were multiplied by a factor based on the assumption that CO_2 represents 95% of the CO_2E emissions associated with passenger vehicles (EPA 2005). The results were then converted from annual tons per year to metric tons per year. Table 9, Estimated Construction GHG Emissions, shows the estimated annual GHG construction emissions associated with the proposed project.

Table 9
Estimated Construction GHG Emissions
(metric tons/year)

Construction Year	CO_2E Emissions
2011	22
2012	514
2013	648
2014	648
2015	648
2016	216

Source: URBEMIS 2007 Version 9.2.4. See Appendix B for complete results.

Operational Emissions

Operation of the proposed project would result in GHG emissions from vehicular traffic generated by residents, area sources (natural gas appliances, hearth combustion, and landscape maintenance), electrical generation, solid waste generation, and water supply. Emissions associated with vehicular traffic, electrical generation, and water supply would be reduced by implementing GHG reduction measures, as indicated below.

Vehicular Traffic

Annual CO_2 emissions from motor vehicle trips for full project buildout were quantified using the URBEMIS 2007 model (refer to Appendix A for additional details and model assumptions). As described earlier, CH_4 and N_2O emissions were accounted for by multiplying the URBEMIS 2007 CO_2 emissions by a factor based on the assumption that CO_2 represents 95% of the CO_2E emissions associated with passenger vehicles (EPA 2005).

Several regulatory initiatives have been passed to reduce on-road vehicle emissions, as previously discussed in Section 8.2. These initiatives (Pavley and EPA/NHTSA standards for light-duty vehicles and the LCFS) have been estimated to reduce emissions from motor vehicles by approximately 32% by the year 2020, according to the SDCGHGI (University of San Diego 2008).

Area Sources

Annual CO_2 emissions from natural gas combustion for space and water heating, hearth combustion, and gas-powered landscape maintenance equipment were estimated using URBEMIS 2007. The CO_2 emissions from natural gas combustion were adjusted by a factor derived from the relative CO_2, CH_4, and N_2O for natural gas as reported in the CCAR's *General Reporting Protocol* (CCAR 2009) for stationary combustion fuels and their GWPs.

The proposed project would be required to comply with Section 15.26.030 of the City's Municipal Code, which requires that new residential projects that fall within climate zone 7 be at least 15% more energy efficient than the 2008 Energy Code. As such, building design would employ energy efficient measures beyond that required by the Energy Code, resulting in a 15% reduction in emissions generated by in-home energy use.

Electrical Generation

Annual electricity use for the proposed project was based upon estimated generation rates for land uses in the San Diego Gas & Electric service area. The proposed project would consume approximately 852,412 kilowatt-hours per year (see Appendix B for calculations). The generation of electricity through combustion of fossil fuels typically results in emissions of CO_2 and to a smaller extent CH_4 and N_2O. Annual electricity emissions were estimated using the reported CO_2 emissions per kilowatt-hour for San Diego Gas & Electric, which would provide electricity for the project. The contributions of CH_4 and N_2O for powerplants in California were obtained from the CCAR's *General Reporting Protocol (*CCAR 2009), which were adjusted for their GWPs.

Again, the proposed project would be required to comply with Section 15.26.030 of the City's Municipal Code, which would result in a 15% reduction in emissions generated by in-home energy use.

Water Supply

Water supplied to the proposed project requires the use of electricity. Accordingly, the supply, conveyance, treatment, and distribution of water would indirectly result in GHG emissions through use of electricity. Water usage rates were obtained from the Water System Evaluation completed for the proposed project (Dexter Wilson Engineering 2010). The estimated electrical usage associated with supply, conveyance, treatment, and distribution of water was obtained from a California Energy Commission report on electricity associated with water supply in California (CEC 2006).

Per Section 15.12 of the City's Municipal Code, all new residential construction, remodels, additions, and alterations must provide a schedule of plumbing fixture fittings that will reduce the overall use of potable water by 20%, which would result in a 20% reduction in the GHG emissions from electricity generated for supply, conveyance, treatment, and distribution of water.

Solid Waste Generation

The proposed project would generate solid waste, and would therefore result in CO_2E emissions associated with landfill offgasing. Solid waste generation rates and CO_2E conversion factors were obtained from the Bay Area Air Quality Management District's (BAAQMD) Greenhouse Gas Model, Version 1.1.9 Beta (BAAQMD 2010).

Summary of Operational Emissions

The estimated GHG emissions associated with vehicular traffic, area sources, electrical generation, water supply, and solid waste generation are shown below in Table 10. Additional detail regarding these calculations can be found in Appendix B. The estimated emissions of CO_2E would be 3,752 metric tons per year without the GHG reduction measures ("business as usual"), and 2,810 metric tons per year with the GHG reduction measures. As indicated in Table 10, the GHG reduction measures would reduce GHG emissions by approximately 25%.

Table 10
Estimated Operational GHG Emissions
(metric tons/year)

Source	CO_2E Emissions	CO_2E Emissions w/ GHG Reduction Measures	Percent Reduction
Motor Vehicles	2,409	1,638	32%
Area Sources			
Natural Gas Combustion	523	445	15%
Hearth Combustion and Other	2	2	0%
Electrical Generation	287	244	15%
Water Supply	248	198	20%
Solid Waste Generation	282	282	0%
Total	3,752	2,810	25%

Source: See Appendix B for complete results.

Assessment of GHG Impacts

The City of Chula Vista has developed a number of strategies and plans aimed at improving air quality while also addressing global climate change. In November 2002, Chula Vista adopted the

Carbon Dioxide Reduction Plan in order to lower the community's major greenhouse gas emissions, strengthen the local economy, and improve the global environment. In addition, as a part of its Growth Management Ordinance and Growth Management Program, the City of Chula Vista requires that an Air Quality Improvement Plan (AQIP) be prepared for all major development projects with air quality impacts equivalent to that of a residential project of 50 or more dwelling units.

As shown in Table 10, with implementation of GHG reduction measures the proposed project would reduce GHG emissions by 25%. The proposed project would therefore exceed the target of 20% below business as usual that has been established for the purposes of assessing operational GHG emissions of projects in the City of Chula Vista, and this reduction would be consistent with the goals of AB 32. Furthermore, the proposed project would be consistent with Section 15.26.030 of the City's Municipal Code by employing energy efficient measures beyond that required by the Energy Code, resulting in a 15% reduction in emissions generated by in-home energy use. Additionally, the proposed project would reduce the overall use of potable water by 20%, consistent with the City's Municipal Code. Lastly, it should be noted that the project is higher-density residential development, which ultimately helps in reducing vehicle miles traveled. The project would therefore have a less than significant impact on global climate change.

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9.0 SUMMARY AND CONCLUSIONS

The air quality impact analysis evaluated the potential for adverse impacts to the ambient air quality due to construction and operational emissions resulting from the proposed project. Construction of the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. The analysis concludes that the daily construction emissions would not exceed the significance thresholds for criteria pollutants. Air quality impacts resulting from construction would, therefore, be less than significant. The proposed project would not result in any significant long-term (operational) impacts to air quality, as new mobile and stationary sources associated with the proposed project following the completion of construction activities would remain well below the significance thresholds.

The project's potential effect on global climate change was evaluated, and emissions of greenhouse gases were estimated based on the use of construction equipment and vehicle trips associated with construction activities, as well as operational emissions once construction phases are complete. With implementation of GHG reduction measures the proposed project would reduce GHG emissions by 25%. The proposed project would therefore exceed the target of 20% below business as usual that has been established for the purposes of assessing operational GHG emissions of projects in the City of Chula Vista, and this reduction would be consistent with the goals of AB 32. Furthermore, the proposed project would be consistent with Section 15.26.030 of the City's Municipal Code by employing energy efficient measures beyond that required by the Energy Code, resulting in a 15% reduction in emissions associated with in-home energy use. Additionally, the proposed project would reduce the overall use of potable water by 20%, consistent with the City's Municipal Code. Lastly, it should be noted that the project is higher-density residential development, which ultimately helps in reducing vehicle miles traveled. The project would therefore have a less than significant impact on global climate change.

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APPENDIX A

URBEMIS 2007 Version 9.2.4 Modeling and Estimated Emissions

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Users\bgrover\AppData\Roaming\Urbemis\Version9a\Projects\Otay Village 2.urb924

Project Name: Otay Village 2

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5
2011 TOTALS (lbs/day unmitigated)	2.86	23.49	12.98	0.00	20.00	1.17	21.18	4.18	1.08	5.26
2011 TOTALS (lbs/day mitigated)	2.86	23.49	12.98	0.00	11.31	1.17	12.49	2.36	1.08	3.44
2012 TOTALS (lbs/day unmitigated)	14.06	22.00	40.05	0.04	20.00	1.39	21.08	4.18	1.27	5.17
2012 TOTALS (lbs/day mitigated)	14.06	22.00	40.05	0.04	11.31	1.39	12.39	2.36	1.27	3.35
2013 TOTALS (lbs/day unmitigated)	13.70	17.99	37.52	0.04	0.17	1.12	1.29	0.06	1.02	1.08
2013 TOTALS (lbs/day mitigated)	13.70	17.99	37.52	0.04	0.17	1.12	1.29	0.06	1.02	1.08
2014 TOTALS (lbs/day unmitigated)	13.37	16.62	35.16	0.04	0.17	1.00	1.17	0.06	0.91	0.97
2014 TOTALS (lbs/day mitigated)	13.37	16.62	35.16	0.04	0.17	1.00	1.17	0.06	0.91	0.97
2015 TOTALS (lbs/day unmitigated)	13.06	15.28	32.99	0.04	0.17	0.93	1.09	0.06	0.84	0.90

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2015 TOTALS (lbs/day mitigated)	13.06	15.28	32.99	0.04	0.17	0.93	1.09	0.06	0.84	0.90
2016 TOTALS (lbs/day unmitigated)	12.77	14.10	31.06	0.04	0.17	0.83	1.00	0.06	0.75	0.81
2016 TOTALS (lbs/day mitigated)	12.77	14.10	31.06	0.04	0.17	0.83	1.00	0.06	0.75	0.81

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	14.22	2.57	9.84	0.00	0.02	0.02

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	9.43	11.07	107.79	0.14	24.68	4.76

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	23.65	13.64	117.63	0.14	24.70	4.78

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5

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Time Slice 12/5/2011-12/30/2011 Active Days: 20	2.86	**23.49**	12.98	0.00	**20.00**	1.17	**21.18**	**4.18**	1.08	**5.26**
Fine Grading 12/05/2011-03/02/2012	2.86	23.49	12.98	0.00	20.00	1.17	21.18	4.18	1.08	5.26
Fine Grading Dust	0.00	0.00	0.00	0.00	20.00	0.00	20.00	4.18	0.00	4.18
Fine Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 1/2/2012-3/2/2012 Active Days: 45	2.72	22.00	12.46	0.00	**20.00**	1.07	21.08	**4.18**	0.99	5.17
Fine Grading 12/05/2011-03/02/2012	2.72	22.00	12.46	0.00	20.00	1.07	21.08	4.18	0.99	5.17
Fine Grading Dust	0.00	0.00	0.00	0.00	20.00	0.00	20.00	4.18	0.00	4.18
Fine Grading Off Road Diesel	2.69	21.95	11.51	0.00	0.00	1.07	1.07	0.00	0.99	0.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.05	0.94	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 3/5/2012-4/30/2012 Active Days: 41	3.17	16.71	11.50	0.00	0.02	**1.39**	1.40	0.01	**1.27**	1.28
Asphalt 03/05/2012-04/30/2012	3.17	16.71	11.50	0.00	0.02	1.39	1.40	0.01	1.27	1.28
Paving Off-Gas	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.54	15.34	9.17	0.00	0.00	1.33	1.33	0.00	1.23	1.23
Paving On Road Diesel	0.09	1.27	0.44	0.00	0.01	0.05	0.06	0.00	0.04	0.05
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01

Time Slice 5/1/2012-7/30/2012 Active Days: 65	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Time Slice 7/31/2012-12/31/2012 Active Days: 110	**14.06**	19.38	**40.05**	**0.04**	0.17	1.24	1.41	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2013-12/31/2013 Active Days: 261	13.70	17.99	37.52	**0.04**	0.17	1.12	1.29	0.06	1.02	1.08
Building 05/01/2012-05/02/2016	3.88	17.99	37.42	0.04	0.17	1.12	1.28	0.06	1.02	1.08
Building Off Road Diesel	2.88	13.91	10.20	0.00	0.00	0.93	0.93	0.00	0.86	0.86
Building Vendor Trips	0.23	2.78	2.44	0.01	0.03	0.11	0.14	0.01	0.10	0.11
Building Worker Trips	0.77	1.30	24.78	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 1/1/2014-12/31/2014 Active Days: 261	13.37	16.62	35.16	**0.04**	0.17	1.00	1.17	0.06	0.91	0.97
Building 05/01/2012-05/02/2016	3.54	16.61	35.07	0.04	0.17	1.00	1.17	0.06	0.91	0.97
Building Off Road Diesel	2.63	12.97	9.89	0.00	0.00	0.82	0.82	0.00	0.76	0.76
Building Vendor Trips	0.21	2.45	2.26	0.01	0.03	0.10	0.12	0.01	0.09	0.10
Building Worker Trips	0.70	1.19	22.92	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2015-12/31/2015 Active Days: 261	13.06	15.28	32.99	**0.04**	0.17	0.93	1.09	0.06	0.84	0.90
Building 05/01/2012-05/02/2016	3.23	15.28	32.90	0.04	0.17	0.93	1.09	0.06	0.84	0.90
Building Off Road Diesel	2.40	12.04	9.62	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Building Vendor Trips	0.19	2.15	2.09	0.01	0.03	0.08	0.11	0.01	0.08	0.09
Building Worker Trips	0.64	1.09	21.19	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Time Slice 1/1/2016-5/2/2016 Active Days: 87	12.77	14.10	31.06	**0.04**	0.17	0.83	1.00	0.06	0.75	0.81
Building 05/01/2012-05/02/2016	2.95	14.09	30.98	0.04	0.17	0.83	1.00	0.06	0.75	0.81
Building Off Road Diesel	2.19	11.19	9.40	0.00	0.00	0.67	0.67	0.00	0.62	0.62
Building Vendor Trips	0.18	1.90	1.95	0.01	0.03	0.08	0.10	0.01	0.07	0.08
Building Worker Trips	0.59	1.00	19.63	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 5/3/2016-7/29/2016 Active Days: 64	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Fine Grading 12/5/2011 - 3/2/2012 - Site Grading Residential Units

Total Acres Disturbed: 30

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

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Phase: Paving 3/5/2012 - 4/30/2012 - Paving Residential Units

Acres to be Paved: 7.5

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 5/1/2012 - 5/2/2016 - Building Construction Residential Units

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 7/31/2012 - 7/29/2016 - Architectural Coating Residential Units

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5

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Time Slice 12/5/2011-12/30/2011 Active Days: 20	2.86	**23.49**	12.98	0.00	11.31	1.17	12.49	2.36	1.08	3.44
Fine Grading 12/05/2011-03/02/2012	2.86	23.49	12.98	0.00	11.31	1.17	12.49	2.36	1.08	3.44
Fine Grading Dust	0.00	0.00	0.00	0.00	11.31	0.00	11.31	2.36	0.00	2.36
Fine Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 1/2/2012-3/2/2012 Active Days: 45	2.72	22.00	12.46	0.00	11.31	1.07	12.39	2.36	0.99	3.35
Fine Grading 12/05/2011-03/02/2012	2.72	22.00	12.46	0.00	11.31	1.07	12.39	2.36	0.99	3.35
Fine Grading Dust	0.00	0.00	0.00	0.00	11.31	0.00	11.31	2.36	0.00	2.36
Fine Grading Off Road Diesel	2.69	21.95	11.51	0.00	0.00	1.07	1.07	0.00	0.99	0.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.05	0.94	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 3/5/2012-4/30/2012 Active Days: 41	3.17	16.71	11.50	0.00	0.02	**1.39**	1.40	0.01	**1.27**	1.28
Asphalt 03/05/2012-04/30/2012	3.17	16.71	11.50	0.00	0.02	1.39	1.40	0.01	1.27	1.28
Paving Off-Gas	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.54	15.34	9.17	0.00	0.00	1.33	1.33	0.00	1.23	1.23
Paving On Road Diesel	0.09	1.27	0.44	0.00	0.01	0.05	0.06	0.00	0.04	0.05
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01

Time Slice 5/1/2012-7/30/2012 Active Days: 65	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Time Slice 7/31/2012-12/31/2012 Active Days: 110	**14.06**	19.38	**40.05**	**0.04**	0.17	1.24	1.41	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2013-12/31/2013 Active Days: 261	13.70	17.99	37.52	**0.04**	0.17	1.12	1.29	0.06	1.02	1.08
Building 05/01/2012-05/02/2016	3.88	17.99	37.42	0.04	0.17	1.12	1.28	0.06	1.02	1.08
Building Off Road Diesel	2.88	13.91	10.20	0.00	0.00	0.93	0.93	0.00	0.86	0.86
Building Vendor Trips	0.23	2.78	2.44	0.01	0.03	0.11	0.14	0.01	0.10	0.11
Building Worker Trips	0.77	1.30	24.78	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Time Slice 1/1/2014-12/31/2014 Active Days: 261	13.37	16.62	35.16	**0.04**	0.17	1.00	1.17	0.06	0.91	0.97
Building 05/01/2012-05/02/2016	3.54	16.61	35.07	0.04	0.17	1.00	1.17	0.06	0.91	0.97
Building Off Road Diesel	2.63	12.97	9.89	0.00	0.00	0.82	0.82	0.00	0.76	0.76
Building Vendor Trips	0.21	2.45	2.26	0.01	0.03	0.10	0.12	0.01	0.09	0.10
Building Worker Trips	0.70	1.19	22.92	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2015-12/31/2015 Active Days: 261	13.06	15.28	32.99	**0.04**	0.17	0.93	1.09	0.06	0.84	0.90
Building 05/01/2012-05/02/2016	3.23	15.28	32.90	0.04	0.17	0.93	1.09	0.06	0.84	0.90
Building Off Road Diesel	2.40	12.04	9.62	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Building Vendor Trips	0.19	2.15	2.09	0.01	0.03	0.08	0.11	0.01	0.08	0.09
Building Worker Trips	0.64	1.09	21.19	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Time Slice 1/1/2016-5/2/2016 Active Days: 87	12.77	14.10	31.06	**0.04**	0.17	0.83	1.00	0.06	0.75	0.81
Building 05/01/2012-05/02/2016	2.95	14.09	30.98	0.04	0.17	0.83	1.00	0.06	0.75	0.81
Building Off Road Diesel	2.19	11.19	9.40	0.00	0.00	0.67	0.67	0.00	0.62	0.62
Building Vendor Trips	0.18	1.90	1.95	0.01	0.03	0.08	0.10	0.01	0.07	0.08
Building Worker Trips	0.59	1.00	19.63	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 5/3/2016-7/29/2016 Active Days: 64	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 12/5/2011 - 3/2/2012 - Site Grading Residential Units

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Natural Gas	0.19	2.47	1.05	0.00	0.00	0.00
Hearth - No Summer Emissions						
Landscape	1.59	0.10	8.79	0.00	0.02	0.02
Consumer Products	9.64					
Architectural Coatings	2.80					
TOTALS (lbs/day, unmitigated)	14.22	2.57	9.84	0.00	0.02	0.02

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Percentage of residences with natural gas fireplaces changed from 55% to 100%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25
Single family housing	9.43	11.07	107.79	0.14	24.68	4.76
TOTALS (lbs/day, unmitigated)	9.43	11.07	107.79	0.14	24.68	4.76

Operational Settings:

Does not include correction for passby trips

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Does not include double counting adjustment for internal trips

Analysis Year: 2016 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	30.00	8.50	dwelling units	197.00	1,674.50	14,316.47
					1,674.50	14,316.47

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.4	0.2	99.6	0.2
Light Truck < 3750 lbs	10.8	0.9	95.4	3.7
Light Truck 3751-5750 lbs	21.9	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.7	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	76.5	23.5
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.6	47.2	52.8	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)

Operational Changes to Defaults

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Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: C:\Users\bgrover\AppData\Roaming\Urbemis\Version9a\Projects\Otay Village 2.urb924

Project Name: Otay Village 2

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5
2011 TOTALS (lbs/day unmitigated)	2.86	23.49	12.98	0.00	20.00	1.17	21.18	4.18	1.08	5.26
2011 TOTALS (lbs/day mitigated)	2.86	23.49	12.98	0.00	11.31	1.17	12.49	2.36	1.08	3.44
2012 TOTALS (lbs/day unmitigated)	14.06	22.00	40.05	0.04	20.00	1.39	21.08	4.18	1.27	5.17
2012 TOTALS (lbs/day mitigated)	14.06	22.00	40.05	0.04	11.31	1.39	12.39	2.36	1.27	3.35
2013 TOTALS (lbs/day unmitigated)	13.70	17.99	37.52	0.04	0.17	1.12	1.29	0.06	1.02	1.08
2013 TOTALS (lbs/day mitigated)	13.70	17.99	37.52	0.04	0.17	1.12	1.29	0.06	1.02	1.08
2014 TOTALS (lbs/day unmitigated)	13.37	16.62	35.16	0.04	0.17	1.00	1.17	0.06	0.91	0.97
2014 TOTALS (lbs/day mitigated)	13.37	16.62	35.16	0.04	0.17	1.00	1.17	0.06	0.91	0.97
2015 TOTALS (lbs/day unmitigated)	13.06	15.28	32.99	0.04	0.17	0.93	1.09	0.06	0.84	0.90

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2015 TOTALS (lbs/day mitigated)	13.06	15.28	32.99	0.04	0.17	0.93	1.09	0.06	0.84	0.90
2016 TOTALS (lbs/day unmitigated)	12.77	14.10	31.06	0.04	0.17	0.83	1.00	0.06	0.75	0.81
2016 TOTALS (lbs/day mitigated)	12.77	14.10	31.06	0.04	0.17	0.83	1.00	0.06	0.75	0.81

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	12.73	4.10	1.75	0.01	0.13	0.13

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	9.54	16.19	113.03	0.12	24.68	4.76

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5
TOTALS (lbs/day, unmitigated)	22.27	20.29	114.78	0.13	24.81	4.89

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5

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Time Slice 12/5/2011-12/30/2011 Active Days: 20	2.86	**23.49**	12.98	0.00	**20.00**	1.17	**21.18**	**4.18**	1.08	**5.26**
Fine Grading 12/05/2011-03/02/2012	2.86	23.49	12.98	0.00	20.00	1.17	21.18	4.18	1.08	5.26
Fine Grading Dust	0.00	0.00	0.00	0.00	20.00	0.00	20.00	4.18	0.00	4.18
Fine Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 1/2/2012-3/2/2012 Active Days: 45	2.72	22.00	12.46	0.00	**20.00**	1.07	21.08	**4.18**	0.99	5.17
Fine Grading 12/05/2011-03/02/2012	2.72	22.00	12.46	0.00	20.00	1.07	21.08	4.18	0.99	5.17
Fine Grading Dust	0.00	0.00	0.00	0.00	20.00	0.00	20.00	4.18	0.00	4.18
Fine Grading Off Road Diesel	2.69	21.95	11.51	0.00	0.00	1.07	1.07	0.00	0.99	0.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.05	0.94	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 3/5/2012-4/30/2012 Active Days: 41	3.17	16.71	11.50	0.00	0.02	**1.39**	1.40	0.01	**1.27**	1.28
Asphalt 03/05/2012-04/30/2012	3.17	16.71	11.50	0.00	0.02	1.39	1.40	0.01	1.27	1.28
Paving Off-Gas	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.54	15.34	9.17	0.00	0.00	1.33	1.33	0.00	1.23	1.23
Paving On Road Diesel	0.09	1.27	0.44	0.00	0.01	0.05	0.06	0.00	0.04	0.05
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01

Time Slice 5/1/2012-7/30/2012 Active Days: 65	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Time Slice 7/31/2012-12/31/2012 Active Days: 110	**14.06**	19.38	**40.05**	**0.04**	0.17	1.24	1.41	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2013-12/31/2013 Active Days: 261	13.70	17.99	37.52	**0.04**	0.17	1.12	1.29	0.06	1.02	1.08
Building 05/01/2012-05/02/2016	3.88	17.99	37.42	0.04	0.17	1.12	1.28	0.06	1.02	1.08
Building Off Road Diesel	2.88	13.91	10.20	0.00	0.00	0.93	0.93	0.00	0.86	0.86
Building Vendor Trips	0.23	2.78	2.44	0.01	0.03	0.11	0.14	0.01	0.10	0.11
Building Worker Trips	0.77	1.30	24.78	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Time Slice 1/1/2014-12/31/2014 Active Days: 261	13.37	16.62	35.16	**0.04**	0.17	1.00	1.17	0.06	0.91	0.97
Building 05/01/2012-05/02/2016	3.54	16.61	35.07	0.04	0.17	1.00	1.17	0.06	0.91	0.97
Building Off Road Diesel	2.63	12.97	9.89	0.00	0.00	0.82	0.82	0.00	0.76	0.76
Building Vendor Trips	0.21	2.45	2.26	0.01	0.03	0.10	0.12	0.01	0.09	0.10
Building Worker Trips	0.70	1.19	22.92	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2015-12/31/2015 Active Days: 261	13.06	15.28	32.99	**0.04**	0.17	0.93	1.09	0.06	0.84	0.90
Building 05/01/2012-05/02/2016	3.23	15.28	32.90	0.04	0.17	0.93	1.09	0.06	0.84	0.90
Building Off Road Diesel	2.40	12.04	9.62	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Building Vendor Trips	0.19	2.15	2.09	0.01	0.03	0.08	0.11	0.01	0.08	0.09
Building Worker Trips	0.64	1.09	21.19	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Time Slice 1/1/2016-5/2/2016 Active Days: 87	12.77	14.10	31.06	**0.04**	0.17	0.83	1.00	0.06	0.75	0.81
Building 05/01/2012-05/02/2016	2.95	14.09	30.98	0.04	0.17	0.83	1.00	0.06	0.75	0.81
Building Off Road Diesel	2.19	11.19	9.40	0.00	0.00	0.67	0.67	0.00	0.62	0.62
Building Vendor Trips	0.18	1.90	1.95	0.01	0.03	0.08	0.10	0.01	0.07	0.08
Building Worker Trips	0.59	1.00	19.63	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 5/3/2016-7/29/2016 Active Days: 64	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Fine Grading 12/5/2011 - 3/2/2012 - Site Grading Residential Units

Total Acres Disturbed: 30

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

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Phase: Paving 3/5/2012 - 4/30/2012 - Paving Residential Units

Acres to be Paved: 7.5

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 5/1/2012 - 5/2/2016 - Building Construction Residential Units

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 7/31/2012 - 7/29/2016 - Architectural Coating Residential Units

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5

Time Slice 12/5/2011-12/30/2011 Active Days: 20	2.86	**23.49**	12.98	0.00	11.31	1.17	12.49	2.36	1.08	3.44
Fine Grading 12/05/2011-03/02/2012	2.86	23.49	12.98	0.00	11.31	1.17	12.49	2.36	1.08	3.44
Fine Grading Dust	0.00	0.00	0.00	0.00	11.31	0.00	11.31	2.36	0.00	2.36
Fine Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 1/2/2012-3/2/2012 Active Days: 45	2.72	22.00	12.46	0.00	11.31	1.07	12.39	2.36	0.99	3.35
Fine Grading 12/05/2011-03/02/2012	2.72	22.00	12.46	0.00	11.31	1.07	12.39	2.36	0.99	3.35
Fine Grading Dust	0.00	0.00	0.00	0.00	11.31	0.00	11.31	2.36	0.00	2.36
Fine Grading Off Road Diesel	2.69	21.95	11.51	0.00	0.00	1.07	1.07	0.00	0.99	0.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.05	0.94	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Time Slice 3/5/2012-4/30/2012 Active Days: 41	3.17	16.71	11.50	0.00	0.02	**1.39**	1.40	0.01	**1.27**	1.28
Asphalt 03/05/2012-04/30/2012	3.17	16.71	11.50	0.00	0.02	1.39	1.40	0.01	1.27	1.28
Paving Off-Gas	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.54	15.34	9.17	0.00	0.00	1.33	1.33	0.00	1.23	1.23
Paving On Road Diesel	0.09	1.27	0.44	0.00	0.01	0.05	0.06	0.00	0.04	0.05
Paving Worker Trips	0.06	0.10	1.89	0.00	0.01	0.01	0.02	0.00	0.00	0.01

Time Slice 5/1/2012-7/30/2012 Active Days: 65	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Time Slice 7/31/2012-12/31/2012 Active Days: 110	**14.06**	19.38	**40.05**	**0.04**	0.17	1.24	1.41	0.06	1.13	1.19
Building 05/01/2012-05/02/2016	4.23	19.38	39.94	0.04	0.17	1.24	1.40	0.06	1.13	1.19
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95
Building Vendor Trips	0.26	3.13	2.63	0.01	0.03	0.12	0.15	0.01	0.11	0.12
Building Worker Trips	0.84	1.43	26.79	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2013-12/31/2013 Active Days: 261	13.70	17.99	37.52	**0.04**	0.17	1.12	1.29	0.06	1.02	1.08
Building 05/01/2012-05/02/2016	3.88	17.99	37.42	0.04	0.17	1.12	1.28	0.06	1.02	1.08
Building Off Road Diesel	2.88	13.91	10.20	0.00	0.00	0.93	0.93	0.00	0.86	0.86
Building Vendor Trips	0.23	2.78	2.44	0.01	0.03	0.11	0.14	0.01	0.10	0.11
Building Worker Trips	0.77	1.30	24.78	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Time Slice 1/1/2014-12/31/2014 Active Days: 261	13.37	16.62	35.16	**0.04**	0.17	1.00	1.17	0.06	0.91	0.97
Building 05/01/2012-05/02/2016	3.54	16.61	35.07	0.04	0.17	1.00	1.17	0.06	0.91	0.97
Building Off Road Diesel	2.63	12.97	9.89	0.00	0.00	0.82	0.82	0.00	0.76	0.76
Building Vendor Trips	0.21	2.45	2.26	0.01	0.03	0.10	0.12	0.01	0.09	0.10
Building Worker Trips	0.70	1.19	22.92	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 1/1/2015-12/31/2015 Active Days: 261	13.06	15.28	32.99	**0.04**	0.17	0.93	1.09	0.06	0.84	0.90
Building 05/01/2012-05/02/2016	3.23	15.28	32.90	0.04	0.17	0.93	1.09	0.06	0.84	0.90
Building Off Road Diesel	2.40	12.04	9.62	0.00	0.00	0.76	0.76	0.00	0.70	0.70
Building Vendor Trips	0.19	2.15	2.09	0.01	0.03	0.08	0.11	0.01	0.08	0.09
Building Worker Trips	0.64	1.09	21.19	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.83	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Time Slice 1/1/2016-5/2/2016 Active Days: 87	12.77	14.10	31.06	**0.04**	0.17	0.83	1.00	0.06	0.75	0.81
Building 05/01/2012-05/02/2016	2.95	14.09	30.98	0.04	0.17	0.83	1.00	0.06	0.75	0.81
Building Off Road Diesel	2.19	11.19	9.40	0.00	0.00	0.67	0.67	0.00	0.62	0.62
Building Vendor Trips	0.18	1.90	1.95	0.01	0.03	0.08	0.10	0.01	0.07	0.08
Building Worker Trips	0.59	1.00	19.63	0.03	0.14	0.08	0.22	0.05	0.06	0.11
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 5/3/2016-7/29/2016 Active Days: 64	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 07/31/2012-07/29/2016	9.82	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	9.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 12/5/2011 - 3/2/2012 - Site Grading Residential Units

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5
Natural Gas	0.19	2.47	1.05	0.00	0.00	0.00
Hearth	0.10	1.63	0.70	0.01	0.13	0.13
Landscaping - No Winter Emissions						
Consumer Products	9.64					
Architectural Coatings	2.80					
TOTALS (lbs/day, unmitigated)	12.73	4.10	1.75	0.01	0.13	0.13

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Percentage of residences with natural gas fireplaces changed from 55% to 100%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25
Single family housing	9.54	16.19	113.03	0.12	24.68	4.76
TOTALS (lbs/day, unmitigated)	9.54	16.19	113.03	0.12	24.68	4.76

Operational Settings:

Does not include correction for passby trips

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Does not include double counting adjustment for internal trips

Analysis Year: 2016 Temperature (F): 40 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	30.00	8.50	dwelling units	197.00	1,674.50	14,316.47
					1,674.50	14,316.47

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.4	0.2	99.6	0.2
Light Truck < 3750 lbs	10.8	0.9	95.4	3.7
Light Truck 3751-5750 lbs	21.9	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.7	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	76.5	23.5
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.6	47.2	52.8	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)

Operational Changes to Defaults

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Users\bgrover\AppData\Roaming\Urbemis\Version9a\Projects\Otay Village 2.urb924

Project Name: Otay Village 2

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	CO2
2011 TOTALS (tons/year unmitigated)	23.50
2011 TOTALS (tons/year mitigated)	23.50
Percent Reduction	0.00
2012 TOTALS (tons/year unmitigated)	547.83
2012 TOTALS (tons/year mitigated)	547.83
Percent Reduction	0.00
2013 TOTALS (tons/year unmitigated)	686.89
2013 TOTALS (tons/year mitigated)	686.89
Percent Reduction	0.00
2014 TOTALS (tons/year unmitigated)	687.02

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2014 TOTALS (tons/year mitigated)	687.02
Percent Reduction	0.00
2015 TOTALS (tons/year unmitigated)	687.13
2015 TOTALS (tons/year mitigated)	687.13
Percent Reduction	0.00
2016 TOTALS (tons/year unmitigated)	229.44
2016 TOTALS (tons/year mitigated)	229.44
Percent Reduction	0.00

AREA SOURCE EMISSION ESTIMATES

	CO2
TOTALS (tons/year, unmitigated)	577.41

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	CO2
TOTALS (tons/year, unmitigated)	2,522.89

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	CO2
TOTALS (tons/year, unmitigated)	3,100.30

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

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	CO2
2011	23.50
Fine Grading 12/05/2011-03/02/2012	23.50
Fine Grading Dust	0.00
Fine Grading Off Road Diesel	22.47
Fine Grading On Road Diesel	0.00
Fine Grading Worker Trips	1.02

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2012	547.83
Fine Grading 12/05/2011-03/02/2012	52.86
Fine Grading Dust	0.00
Fine Grading Off Road Diesel	50.56
Fine Grading On Road Diesel	0.00
Fine Grading Worker Trips	2.30
Asphalt 03/05/2012-04/30/2012	34.87
Paving Off-Gas	0.00
Paving Off Road Diesel	26.21
Paving On Road Diesel	4.48
Paving Worker Trips	4.19
Building 05/01/2012-05/02/2016	459.44
Building Off Road Diesel	141.85
Building Vendor Trips	63.85
Building Worker Trips	253.74
Coating 07/31/2012-07/29/2016	0.64
Architectural Coating	0.00
Coating Worker Trips	0.64

2013	686.89
Building 05/01/2012-05/02/2016	685.36
Building Off Road Diesel	211.57
Building Vendor Trips	95.23
Building Worker Trips	378.57
Coating 07/31/2012-07/29/2016	1.53
Architectural Coating	0.00
Coating Worker Trips	1.53
2014	687.02
Building 05/01/2012-05/02/2016	685.49
Building Off Road Diesel	211.57
Building Vendor Trips	95.24
Building Worker Trips	378.69
Coating 07/31/2012-07/29/2016	1.53
Architectural Coating	0.00
Coating Worker Trips	1.53
2015	687.13
Building 05/01/2012-05/02/2016	685.60
Building Off Road Diesel	211.57
Building Vendor Trips	95.24
Building Worker Trips	378.79
Coating 07/31/2012-07/29/2016	1.53
Architectural Coating	0.00
Coating Worker Trips	1.53

2016	229.44
Building 05/01/2012-05/02/2016	228.55
Building Off Road Diesel	70.52
Building Vendor Trips	31.75
Building Worker Trips	126.28
Coating 07/31/2012-07/29/2016	0.89
Architectural Coating	0.00
Coating Worker Trips	0.89

Phase Assumptions

Phase: Fine Grading 12/5/2011 - 3/2/2012 - Site Grading Residential Units

Total Acres Disturbed: 30

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 3/5/2012 - 4/30/2012 - Paving Residential Units

Acres to be Paved: 7.5

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 5/1/2012 - 5/2/2016 - Building Construction Residential Units

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 7/31/2012 - 7/29/2016 - Architectural Coating Residential Units

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	CO2
2011	23.50
Fine Grading 12/05/2011-03/02/2012	23.50
Fine Grading Dust	0.00
Fine Grading Off Road Diesel	22.47
Fine Grading On Road Diesel	0.00
Fine Grading Worker Trips	1.02

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2012	547.83
Fine Grading 12/05/2011-03/02/2012	52.86
Fine Grading Dust	0.00
Fine Grading Off Road Diesel	50.56
Fine Grading On Road Diesel	0.00
Fine Grading Worker Trips	2.30
Asphalt 03/05/2012-04/30/2012	34.87
Paving Off-Gas	0.00
Paving Off Road Diesel	26.21
Paving On Road Diesel	4.48
Paving Worker Trips	4.19
Building 05/01/2012-05/02/2016	459.44
Building Off Road Diesel	141.85
Building Vendor Trips	63.85
Building Worker Trips	253.74
Coating 07/31/2012-07/29/2016	0.64
Architectural Coating	0.00
Coating Worker Trips	0.64

2013	686.89
Building 05/01/2012-05/02/2016	685.36
Building Off Road Diesel	211.57
Building Vendor Trips	95.23
Building Worker Trips	378.57
Coating 07/31/2012-07/29/2016	1.53
Architectural Coating	0.00
Coating Worker Trips	1.53
2014	687.02
Building 05/01/2012-05/02/2016	685.49
Building Off Road Diesel	211.57
Building Vendor Trips	95.24
Building Worker Trips	378.69
Coating 07/31/2012-07/29/2016	1.53
Architectural Coating	0.00
Coating Worker Trips	1.53
2015	687.13
Building 05/01/2012-05/02/2016	685.60
Building Off Road Diesel	211.57
Building Vendor Trips	95.24
Building Worker Trips	378.79
Coating 07/31/2012-07/29/2016	1.53
Architectural Coating	0.00
Coating Worker Trips	1.53

2016		229.44
Building 05/01/2012-05/02/2016	228.55	
Building Off Road Diesel	70.52	
Building Vendor Trips	31.75	
Building Worker Trips	126.28	
Coating 07/31/2012-07/29/2016	0.89	
Architectural Coating	0.00	
Coating Worker Trips	0.89	

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 12/5/2011 - 3/2/2012 - Site Grading Residential Units

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	CO2
Natural Gas	575.10
Hearth	1.04
Landscape	1.27
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, unmitigated)	577.41

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Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Percentage of residences with natural gas fireplaces changed from 55% to 100%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	CO2
Single family housing	2,522.89
TOTALS (tons/year, unmitigated)	2,522.89

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2016 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	30.00	8.50	dwelling units	197.00	1,674.50	14,316.47
					1,674.50	14,316.47

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.4	0.2	99.6	0.2

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Truck < 3750 lbs	10.8	0.9	95.4	3.7
Light Truck 3751-5750 lbs	21.9	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.7	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	76.5	23.5
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.6	47.2	52.8	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

% of Trips - Commercial (by land use)

Operational Changes to Defaults

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APPENDIX B

Greenhouse Gas Emissions Calculations

Otay Ranch Village Two
Summary of Greenhouse Gas Operational Emissions
Business As Usual

Source	CO_2E (Mtons/yr)	Percent of Total
Motor Vehicles	2,409	64.2%
Area Sources		
Natural Gas Combustion	523	13.9%
Hearth Combustion and Other	2	0.1%
Electrical Generation	287	7.6%
Water Supply	248	6.6%
Solid Waste	282	7.5%
Total	3,752	100.0%

Otay Ranch Village Two
Summary of Greenhouse Gas Operational Emissions
Proposed Project

Source	CO_2E (Mtons/yr)	Percent of Total
Motor Vehicles	1,638	58.3%
Area Sources		0.0%
Natural Gas Combustion	445	15.8%
Hearth Combustion and Other	2	0.1%
Electrical Generation	244	8.7%
Water Supply	198	7.1%
Solid Waste	282	10.1%
Total	2,810	100.0%

Source:
1. Motor vehicle emissions reduced by 32%
2. Natural gas combustion emissions reduced by 15%
3. Electrical generation emissions reduced by 15%
4. Water supply emissions reduced by 20%

Otay Ranch Village Two
CO_2-to-CO_2 Equivalent Factors

	Source	Units	CO_2	CH_4	N_2O	CO_2E/CO_2
Global Warming Potential			1	21	310	
Diesel Equipment	1	kg/gal	10.15	0.00058	0.00026	1.009
Diesel Trucks	2	g/mi	1,450.00	0.0051	0.0048	1.001
Passenger Vehicles	3					1.053
Electrical Generation	4	lb/MWh	739.05	0.0302	0.0081	1.004
Natural Gas Combustion	5	kg/MMBtu	53.06	0.005	0.0001	1.003
Wood Combustion	5	kg/MMBtu	93.87	0.316	0.0042	1.085

Serving Utility: SDG&E

1. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Tables C.6 and C.7.
2. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Tables C.3 and C.4.
3. US EPA, Office of Transportation and Air Quality. 2005. *Greenhouse Gas Emissions from a Typical Passenger Vehicle* (EPA420-F-05-004), p. 4.
4. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector. http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Table C.2.
5. California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Tables C.7 and C.8.

Otay Ranch Village Two
Construction Emissions

	CO_2 (tons/yr)					CO_2E (Mtons/yr)
	Grading	**Paving**	**Building Construction**	**Coatings**	**Total**	
2011						
Off-Road Diesel	22.47				22.47	20.57
On-Road Diesel	-				-	-
Worker Trips	1.02				1.02	0.97
Total	23.49				23.49	**21.55**
2012						
Off-Road Diesel	50.56	26.21	141.85		218.62	200.14
On-Road Diesel	-	4.48	-		4.48	4.07
Worker Trips	2.30	4.19	317.59	0.64	324.72	310.09
Total	52.86	34.88	459.44	0.64	547.82	**514.30**
2013						
Off-Road Diesel			211.57		211.57	193.69
On-Road Diesel			-		-	-
Worker Trips			473.80	1.53	475.33	453.91
Total			685.37	1.53	686.90	**647.60**
2014						
Off-Road Diesel			211.57		211.57	193.69
On-Road Diesel			-		-	-
Worker Trips			473.92	1.53	475.45	454.03
Total			685.49	1.53	687.02	**647.72**
2015						
Off-Road Diesel			211.57		211.57	193.69
On-Road Diesel			-		-	-
Worker Trips			474.03	1.53	475.56	454.13
Total			685.60	1.53	687.13	**647.82**
2016						
Off-Road Diesel			70.52		70.52	64.56
On-Road Diesel			-		-	-
Worker Trips			158.03	0.89	158.92	151.76
Total			228.55	0.89	229.44	**216.32**

Otay Ranch Village Two
Motor Vehicle and Area Source Operational Emissions

	CO_2 (tons/yr)[1]	CO_2E (Mtons/yr)
Motor Vehicles	2,522.89	2,409.21
Area Sources	577.41	525.16
Natural Gas Combustion	575.10	523.06
Hearth Combustion	1.04	0.95
Landscaping	1.27	1.27
Total Operational		2,934.37

Source:
1. URBEMIS Output

Notes:

CO_2E	Carbon dioxide equivalent
Mtons	metric tons (= 1.1023 tons)

Otay Ranch Village Two
Greenhouse Gas Emissions from Project Electrical Demand

Land Use	Units	Electrical Demand Factor[1] (kW-hr/unit/yr)	Electric Demand (kW-hr/yr)	CO_2E Emission Factor[2] (lbs CO_2E/kW-hr)	Annual CO_2E Emissions (Mtons CO_2E/yr)
Single Family Residential	49 DU	7,604	372,596	0.742	125.44
Multifamily Residential	148 DU	3,242	479,816	0.742	161.49
					286.93

Utility Region: SDG&E

Sources:

1. KEMA-XENERGY. 2006. *California Statewide Residential Appliance Saturation Study Update to Air-Conditioning Unit Energy Consumption Estimates Using 2004 Billing Data*. Prepared for California Energy Commission, CEC-400-2006-009. June.
2. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, Table C.2.

Notes:

CO_2E	Carbon dioxide equivalent
kW-hr	kilowatt-hour
MT	metric tons (= 2,204.623 lbs)

Otay Ranch Village Two
Greenhouse Gas Emissions from Project Water Supply

Land Use	Units	Unit Demand[1]	Average Day Demand (gpd)	Acre-Feet per Year	Electrical Demand Factor[2] (kW-hr/AF)	Electric Demand (kW-hr/yr)	CO_2E Emission Factor[3] (lbs CO_2E/kW-hr)	Annual CO_2E Emissions (Mtons CO_2E/yr)
SF/MF Residential	197 DU	300 gpd/DU	59,100	66.20	11,110	735,478	0.742	247.60 *247.60*

Sources:

1. Dexter Wilson Engineering. 2010. Village 2 SPA Amendment Water System Evaluation. December 28.
2. California Energy Commission. 2006. *Refining Estimates of Water Related Energy Use in California.* http://www.energy.ca.gov/2006publications/CEC-500-2006-118/CEC-500-2006-118.PDF
3. San Diego Gas & Electric. 2010. Annual Entity Emissions: Electric Power Generation/Electric Utility Sector http://www.climateregistry.org/CarrotDocs/35/2009/2008_SDGE_PUP(March 26).xls and California Climate Action Registry. 2009. *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions* , Version 3.1, Table C.2.

Notes:

CO_2E	Carbon dioxide equivalent
kW-hr	kilowatt-hour
Mtons	metric tons (= 2,204.62 lbs)

Otay Ranch Village Two
Greenhouse Gas Emissions from Solid Waste Generation

Land Use	Units	Estimated Solid Waste Generation Rate[1] (tons/unit/yr)	Estimated Solid Waste Generation Per Year (tons)
Single Family Residential	49 DU	2.2300	109.3
Multifamily Residential	148 DU	1.1700	173.2
			282.43

Sources:
1. Bay Area Air Quality Management District (BAAQMD). 2010. Greenhouse Gas Model (BGM). Version 1.1.9 Beta.

Notes:

CO_2E	Carbon dioxide equivalent
MT	metric tons (= 2,204.623 lbs)

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